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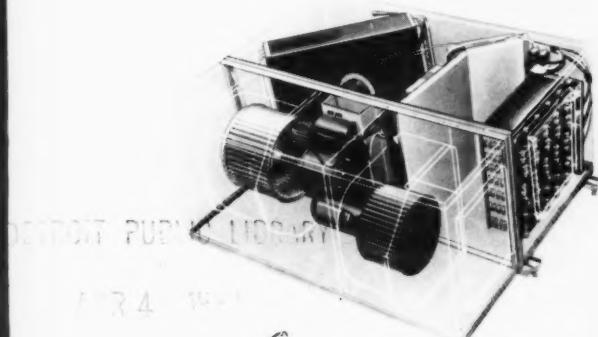
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Finishing Water Heater Jackets at Hotstream — Page 52



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Electric Heating

Department

See

Electric Heating: What, Where and How — Page 26



Packaging and Handling Commercial Cooking Equipment — Page 78

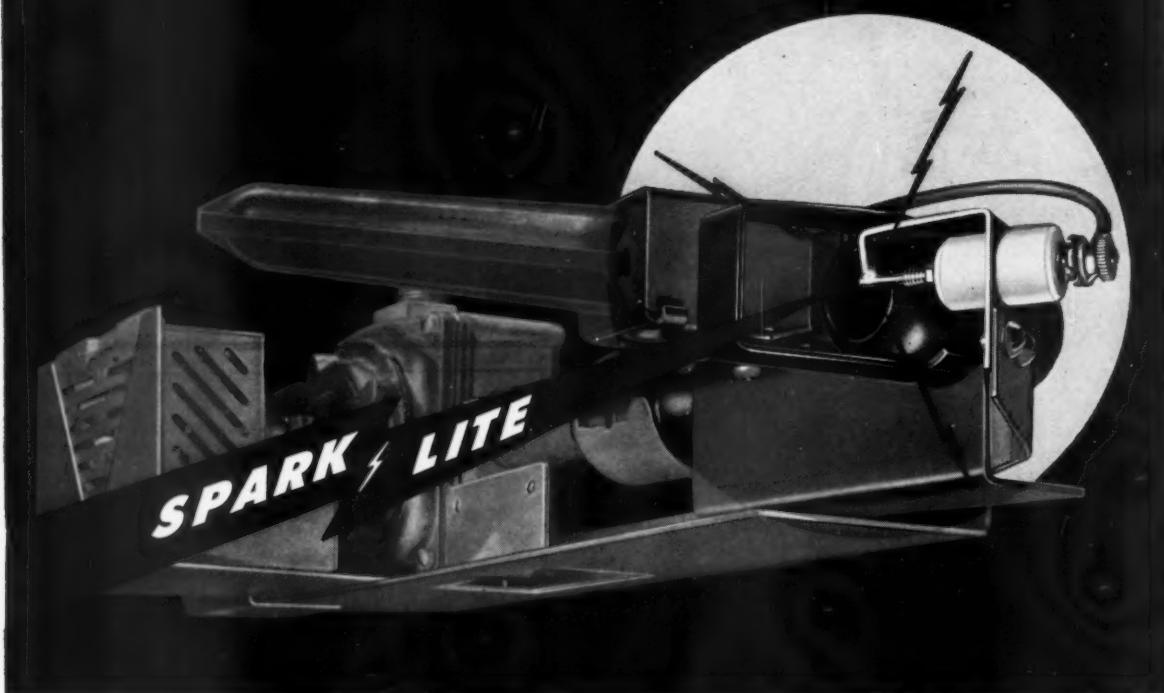
ELIMINATE PILOT, ELIMINATE GLOW-COIL, GET INSTANTANEOUS GAS IGNITION EVERY TIME

On gas dryers . . . as your own records will show . . . one of the most frequent causes for service complaints is failure of the pilot burner and glow-coil igniter. This problem now becomes a thing of the past. Controls Company of America's new Spark Lite ignition system works effectively in spite of low gas pressure, drafts, and low line voltage. Its simple operation gives it extremely long service life . . . keeps the housewife happy with your gas dryer year after year.

CC's complete Spark Lite system consists of a combination main burner control valve and regulator, a flame detector, a safety lock-out control, spark electrode, and transformer. The system is furnished as a complete unit, ready for installation . . . ready to add saleability and customer satisfaction to your dryers.

Write today for all the facts. Learn all the values of CC's "Control Systems Approach" to solving this costly problem.

CC's new Spark Lite ignition system costs no more . . . ends your number-one service problem



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CONTROLS COMPANY OF AMERICA

APPLIANCE AND AUTOMOTIVE DIVISION

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Complete information on Armco ALUMINIZED STEEL is readily available. Just call your nearest Armco Sales Office or fill in and mail the coupon.

Armco Steel Corporation
1480 Curtis Street, Middletown, Ohio

Please send more information on Armco ALUMINIZED STEEL Type 1.

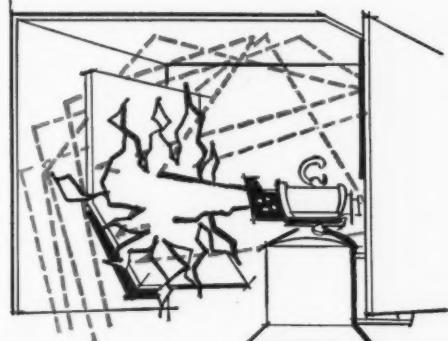
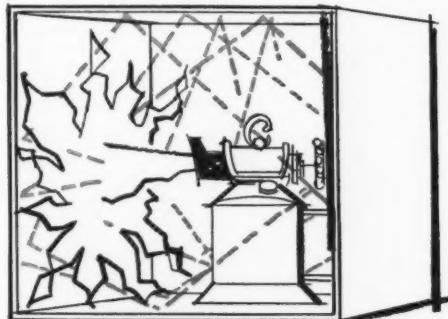
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M E T A L P R O D U C T S M A N U F A C T U R I N G

FROM RAW METAL TO FINISHED PRODUCT

A trade publication devoted to the interests of the metal products manufacturing industry with special editorial attention to home appliances. The editorial scope covers design, engineering, market and statistical information and technical and practical information on plant facilities and all phases of manufacturing "from raw metal to finished product." Free controlled circulation to top management, purchasing, engineering and key plant management and supervision in metal product manufacturing plants. To others, subscription price is \$8.00 per year, domestic. To all other countries \$10.00 per year (U.S. funds). Single copies, \$1.00.

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Associate Editor • RAY SCHUSTER
Contributing Editor • GILBERT C. CLOSE
Publisher's Assistant • DOROTHEA C. MEEKER
Circulation Manager • KATHRYN BANCROFT
Mgr. Customer Service • DANA CHASE, JR.
Customer Service • CAROL KLEPPIN
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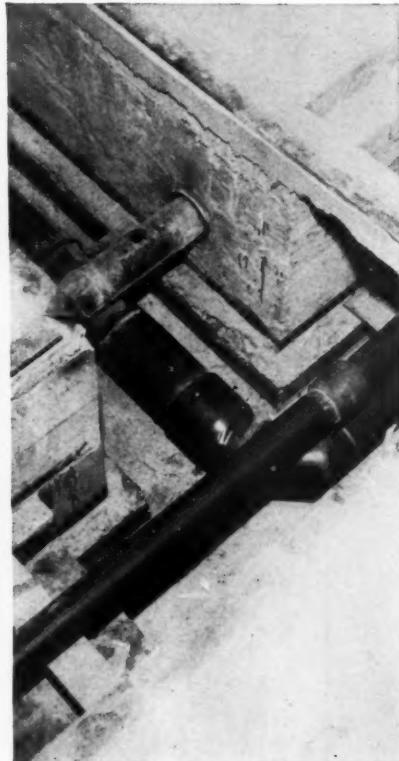
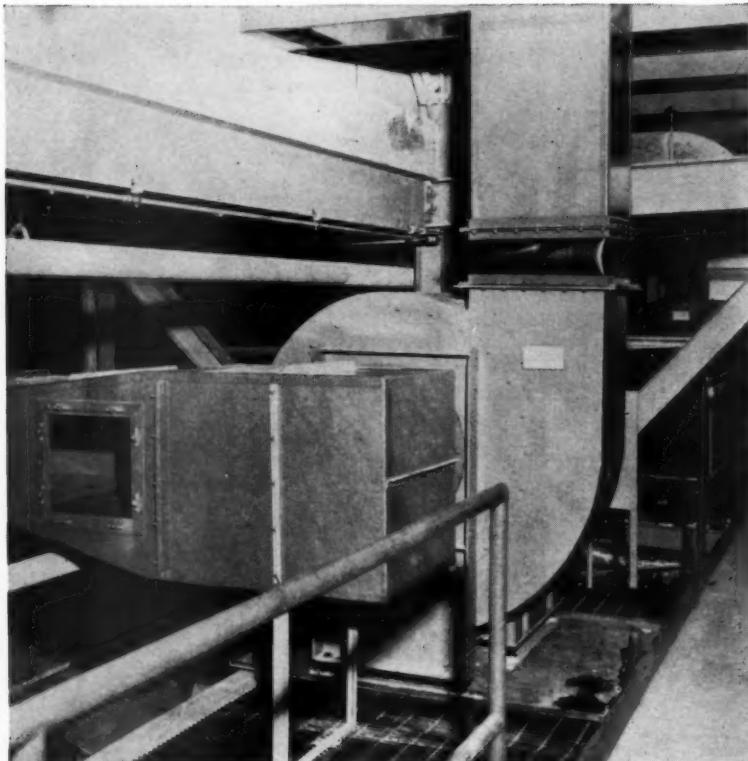
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News about

B.F.Goodrich Chemical *raw materials*



Electrical manufacturer ends corrosion problem *... uses fume ducts and sewer pipe of Geon*

This major electrical equipment manufacturer solved his maintenance problems and cut costs by installing ductwork and pipe made from Geon vinyl. Ordinary pipe or duct would create corrosion problems in no time—but Geon is unaffected by most causes of corrosion.

Sheet for duct use or pipe made of Geon vinyl is easy to use. Installation crews like it because it is so light in weight and easy to work with. Fittings, nuts and bolts of Geon vinyl are also available. Pipe can be

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How can your plant gain from ductwork or pipe of Geon vinyl? Get more information today. Write Dept. GD-3, B. F. Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.



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TI-CO® galvanized
steel
sheets 

MPM

Editor's Mail

Stud welding gun

Gentlemen: We have read with interest your article, "Stud welding simplifies handling of glass-lined water heater tanks," and would appreciate it if you would put us in touch with a supplier of the hangers and the stud welding gun, as we also have this problem.

F. T. Taylor, Chief Engineer
John Wood Co., Ltd.
Toronto, Ontario, Canada

Mr. Taylor's request has been forwarded to Nelson Stud Welding Div., Gregory Industries, Inc., Lorain, Ohio.

The Editors

Airless spray system

Gentlemen: We have noticed in the December issue of Metal Products Manufacturing an item on Page 82 which mentions an illustrated brochure on Airless Spray Systems.

Will you please send us a copy of this brochure and any other information pertinent to this system so that we may consider this for use in our work here at the Boeing Airplane Co. Please send this to us at Renton, Wash.

Richard D. Roselle
Walter Dorwin Teague Associates
New York, N. Y.

Chapman to Canadian GE

Gentlemen: Would you please send Metal Products Manufacturing to the following address: Canadian General Electric Co., Ltd., Civilian Atomic Power Dept., 107 Park St., N., Peterborough, Ontario, Canada. My former business address had been: General Steel Wares, Ltd., 199 River St., Toronto, Ontario.

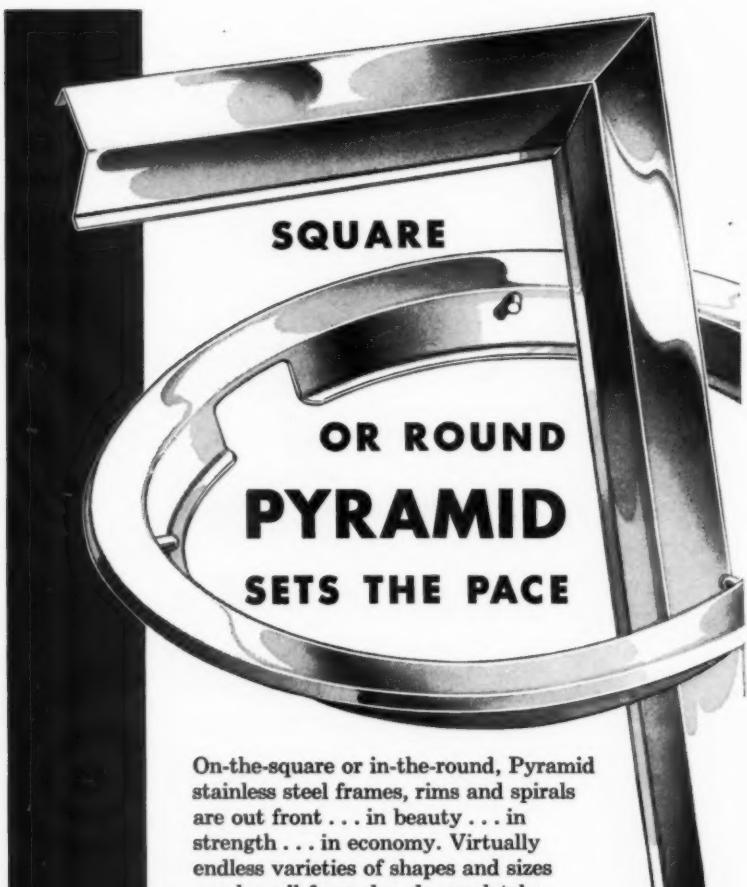
H. Chapman, Manufacturing Engineering
Canadian General Electric Co., Ltd.
Peterborough, Ontario, Canada

"Service after the sale"

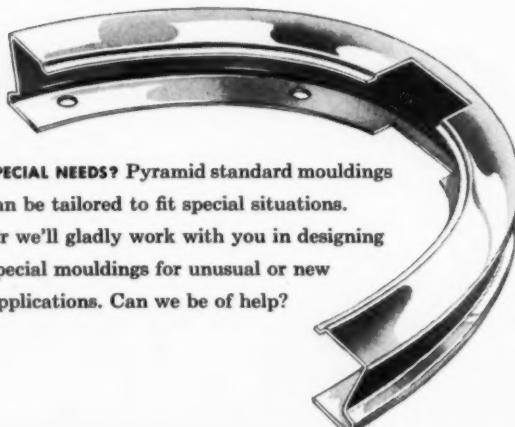
Gentlemen: To "The Finish Line!" Thanks for the thoughts on a happy holiday season and the need for "Service after the sale." (See *Finish Line Editorial, December, 1959 MPM*.)

I have a thought that has been with me for this year and many past. It is the thought of economic structure and the need of management to give thought to it.

All manufacturers have been faced with ever-increasing cost from every service, land, light, power, materials, labor, taxes, and interest, etc. All are taking it on the chin and are turning up with lower incomes. For the health of the economic wellbeing of all of us, to Page 18 →



On-the-square or in-the-round, Pyramid stainless steel frames, rims and spirals are out front . . . in beauty . . . in strength . . . in economy. Virtually endless varieties of shapes and sizes can be roll formed and completely fabricated, ready to attach. Each designed to add a touch of luxury while reducing your production costs. Like more details? We'll be more than pleased to forward complete information and samples.



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Pyramid Mouldings Inc.

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UPLAND, CALIFORNIA BRONXVILLE, NEW YORK

Use **KS** TIMERS TO KEEP YOUR APPLIANCE CUSTOMERS **SATISFIED**

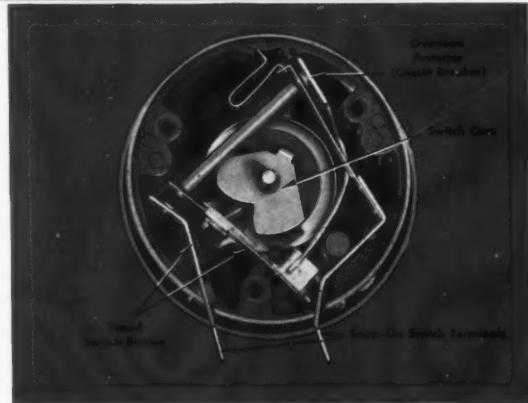
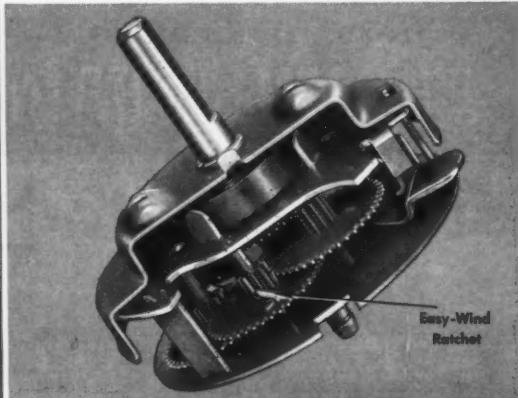
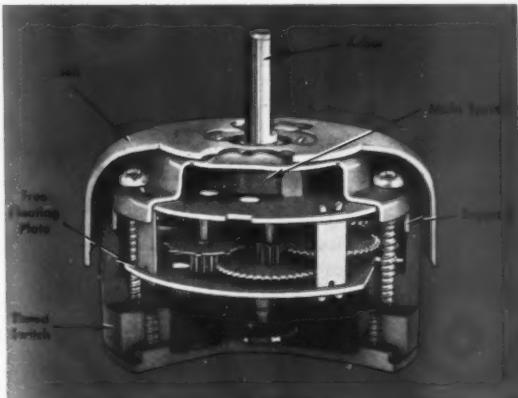
The K-S Improved Interval Timer is accurate and it retains its accuracy—needs no servicing.

The K-S Timer is engineered for easy, economical installation by the appliance manufacturer.

Here are some of the basic reasons:

- Standard models, all self powered, provide a bell alarm, a control switch and overload circuit breaker in any desired combination.
- Time interval selections are 15-20-30-60 or 90 minutes as required.
- A HOLD feature acts to hold the switch closed with the timer mechanism stopped until the dial is returned to the "off" position.
- Approved by Underwriters' Laboratories for 15 amp., $\frac{1}{3}$ hp., 125v A.C.
- Permanently lubricated at the factory.
- May be mounted in any position — only 2 screws required.

For complete specifications and wiring diagrams write for Bulletin 575.



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Plants at: ANN ARBOR • SCIO • YPSILANTI

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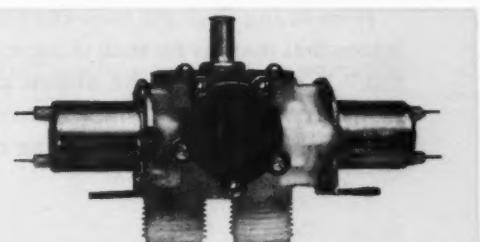
HOW TO "TAG" A MARKET TREND FOR INCREASED PROFITS WITH DOLE THERMOSTATIC CONTROLS

Now is the time to get set for the rapidly rising demand for thermostatically controlled automatic washers. Dole engineers can help you tag this trend for a healthy profit.

What's the new impetus behind the switch? As your own Home Economist will confirm, Textile mills are now tagging all fabrics to denote exact type and percentage of natural and synthetic fibres. Manufacturers are labeling garments and adding specific washing temperature instructions best suited to the particular fibre or combination. Consumers are rapidly being educated to the direct relation between a garment's service life and proper washing temperatures.

Result: An increasing demand for washers with positive thermostatic control of water temperature over a wide range of selectivity.

Providing controls to meet the most exacting and versatile requirements of the appliance industry is what has made Dole a leader in the field of water and temperature control. So why not check with our engineering department now through the Dole field engineer who calls on you regularly. There's an excellent chance he'll be able to help you put a "Sold" tag on a lot of future orders by helping you design and build in a Dole Thermostatic control.



Dole Solenoid Valves have been specified on the finest automatic washers from the beginning to turn water on and off, control flow and mix to desired temperatures.

Control with

DOLE

Appliance Controls Sales Department
THE DOLE VALVE COMPANY
 6201 Oakton St., Morton Grove, Illinois, (Chicago Suburb)
 Dole Valve Co., of Canada Ltd.,
 Box 428, Oakville, Ontario
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enameling costs can be cut

*reject percentage can be reduced
... efficiency can be boosted*

● Want proof? There's a very logical reason why Ing-Rich Frits along with Ing-Rich "Know How" is accomplishing worth-while economies for our customers.

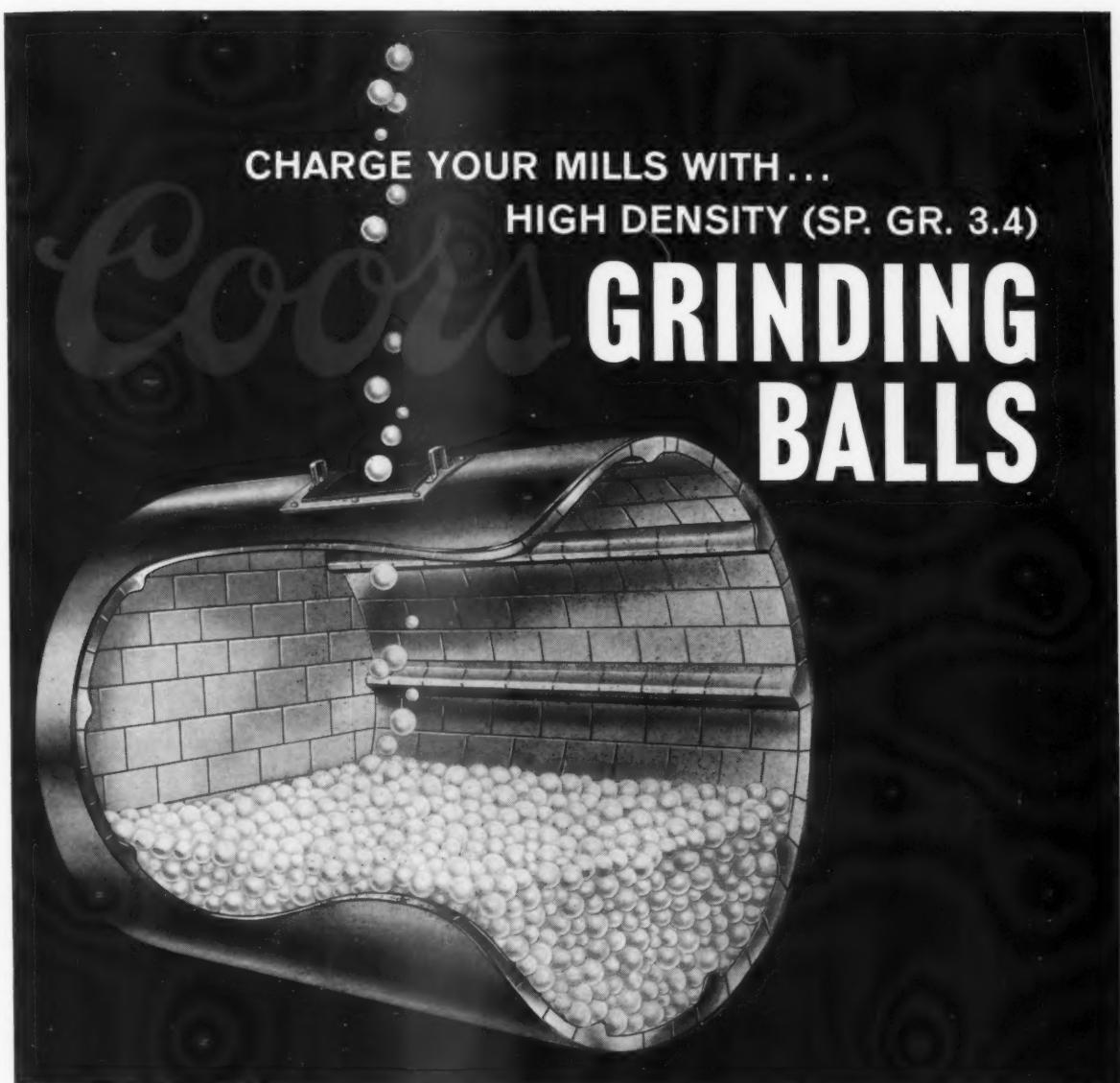
Here at Ing-Rich the buck can't be passed. We know that there is no such thing as a "foolproof frit." We know that the almost perfect conditions prevailing in a laboratory are seldom achieved under practical working conditions . . .

so, our top flight ceramic engineers must prove their case to the technicians in our own large job enameling plant.

Ing-Rich Frits and Ing-Rich "Know How" can cut your enameling costs. Ing-Rich Ceramic Engineers, graduates also of the important school of practical experience, stand ready to come into your plant and prove our case.

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REDUCE your grinding time 40 percent or more! Increased grinding efficiency results from the greater weight (Sp. Gr. 3.4) of Coors High Density Grinding Media.

INCREASE production of existing mills by taking advantage of the reduced grinding time—or you can increase the batch and get more volume from your mills on your present grinding schedule.

IMPROVE milling results—by operating your mills at lower temperatures, by eliminating excessive amounts of unground material, by making it easier to clean the media and by getting longer wear from the media and the mill lining.

We shall be glad to give you our recommendations on how to achieve these results if you will write to us on your company letterhead and describe your operating problem.

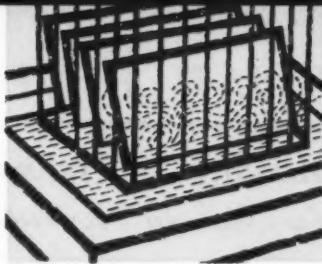
COORS PORCELAIN COMPANY
600 NINTH STREET—GOLDEN, COLORADO

Manufacturers of High Density Grinding Media and Mill Liner Brick.

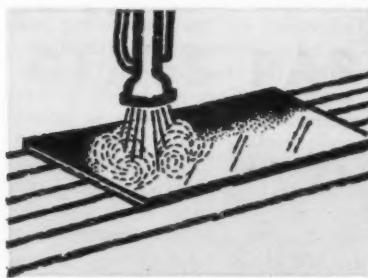
NEW PRODUCT NEWS FROM **Pfizer** NOW!

Chas. Pfizer & Co., Inc., 630 Flushing Ave., Brooklyn 6, N.Y. Chemical Sales Division, Branch Offices: Clifton, N.J.; Chicago, Ill.; San Francisco, Calif.; Atlanta, Ga.

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citric bath



2
Apply cover
coat frit directly.



3
Fire in existing
equipment.



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It's simple. The secret of really practical *direct-on* porcelain enameling is using a *citric acid* solution as your pickling bath. And *direct-on* porcelain enameling means you can double your oven capacity, cut your handling and obtain a better, more flexible porcelain coating. Bond and finish characteristics are excellent.

In this new Ray-Davis* process, only cover coat enamel is required. The ground coat step is completely eliminated. Although adequate process controls are needed, no special handling technique or major installation of equipment is required.

Mail in the coupon below for complete technical information on this important new porcelain enameling development.

Important advantages of the Ray-Davis Direct-On process

- No special handling of pickled steel is required.
- No major installation of special equipment necessary.
- Uses non-premium type steels.
- Easy to handle—citric is a dry, non-toxic, water soluble acid.
- Only one application of frit.
- Doubles oven capacity.

*Developed by W. G. Ray, Chas. Pfizer & Co. and Shipp C. Davis, Daco Corp.

Over 100 Years



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Atlanta, Ga.; Dallas, Tex.; Montreal, Can.

Mail this coupon to:

CHAS. PFIZER & CO., INC. CHEMICAL SALES DIVISION
630 Flushing Avenue, Brooklyn 6, N.Y.

Please send me: Technical Information
 Sample of steel porcelainized by Ray-Davis process

Name _____

Company _____

Address _____

City _____ State _____

THE FINISH LINE

MPM

RELIABILITY—THE FIGURE OF MERIT OF CONSUMER DURABLES

A GUEST EDITORIAL by Marvin A. Fuller •

STAFF ENGINEER,
WHIRLPOOL CORPORATION

REliability is often considered as a factor peculiar to durable goods technology — the engineering and production functions. The term connotes trustworthiness, confidence, and being worthy of dependency. The consumer's desires are for a service, a service which is ever present and reliable. The durable goods industry is looked upon as a complex of corporations which provides the family servants. Indeed, if this thesis be true, the objective of reliability belongs not just to those in technological activities but to every part of the system — administrative, conceptual, production, distribution, and maintenance.

Just over 100 years ago, Oliver Wendell Holmes in his poem "The Deacon's Masterpiece," espoused the concept of reliability of consumer durables in a somewhat humorous vein. The Deacon was an embodiment of the entire system. Holmes called his functional tale of the system a "logical story." In concise terms, he demonstrated that it requires morals, brains, goals, and guts to achieve reliability.

*Have you ever heard of the wonderful one-boss shay,
That was built in such a logical way
It ran a hundred years to a day,
And then, of a sudden, it — ab, but stay,
I'll tell you what happened without delay,
Scaring the parson into fits,
Frightening people out of their wits, —
Have you ever heard of that, I say?*

*Now in building of chaises, I tell you what,
There is always somewhere a weakest spot, —
In bub, tire, felloe, in spring or thill,
In panel, or crossbar, or floor, or sill,
In screw, bolt, thoroughbrace, — lurking still,
Find it somewhere you must and will, —
Above or below, or within or without, —
And that's the reason, beyond a doubt,
That a chaise breaks down, but doesn't wear out.*

*But the Deacon swore (as Deacons do,
With an 'I dew vum,' or an 'I tell yeou')
He would build one shay to beat the taoun
'n' the keounty 'n' all the kentry raoun';
It shoud be so built that it couldn't break daown:
'Fur,' said the Deacon, 't's mighty plain
Tbut the weakes' place mus' stan' the strain;
'n' the way t' fix it, uz I maintain,
Is only jest
T make that place uz strong uz the rest.'*

While the Deacon's shay had a timespan of reliability of "100 years to the day," all will agree that man's needs today are dynamic rather than static and thus demand a timespan for durable goods of a decade or less. However, as one studies service calls on household consumer durables, the Deacon's analysis — that there is "always somewhere a weakest spot" which causes the appliance to "breakdown but never wear out" — is still true today.

The practice of engineering has been described as planning, scheming, devising, and managing to utilize the energies and materials of nature to solve the needs of man. Once the goal is determined, engineering practices (and its fruition — production) can proceed in earnest. The modern tools of engineering are many and diversified; basic knowledge from research, availability and character of materials from suppliers, evaluations from test laboratories, knowledge of production means and the methods of a plant, knowledge of the means and methods utilized by Quality Control and on ad infinitum. Such knowledge coupled with

ingenuity can and will lead to equalized physical reliability of the parts that go to make up the durable goods product.

Durable goods are only "so many pounds of steel and other materials" until connected to sources of energy, integrated into the family living pattern in a manner to make it convenient and aesthetically appealing. This suggests that an integrated system is necessary to achieve reliability of the end service to the consumer. In other words, a reliable "Rube Goldberg" device is not enough.

*First of November, 'Fifty-five!
This morning the parson takes a drive.
Now, small boys, get out of the way!
Here comes the wonderful one-boss shay,
Drawn by a rat-tailed, ewe-necked bay.
'Huddup!' said the parson. — Off went they.
The parson was working his Sunday's text, —
Had got to fifthly, and stopped perplexed
At what the — Moses — was coming next.
All at once the horse stood still,
Close by the meet'n'-house on the hill.
First a shiver, and then a thrill,
Then something decidedly like a spill, —
And the parson was sitting upon a rock,
At half past nine by the meet'n'-house clock, —
Just the hour of the Earthquake shock!
What do you think the parson found,
When he got up and stared around?
The poor old chaise in a heap or mound,
As if it bad been to the mill and ground!
You see, of course, if you're not a dunce,
How it went to pieces all at once, —
All at once, and nothing first, —
Just as bubbles do when they burst.
End of the wonderful one-boss shay.
Logic is logic. That's all I say.*

The adequacy of any logical thesis and the judgement of its depth depends on the results of its application. In engineering terminology this connotes "feedback." The feedback to the conception function within many companies in the durable goods industry today is fraught with many of the problems familiar to engineering — overamplification of the signal, distortion, underamplification, lack of response over the whole band, and the like. Whether the system be made up of one company or a multiplicity of companies, a high degree of moral rectitude and common goals are the necessary means to achieve on-target pursuit of the objective.

Since companies are merely a means of pooling the abilities of many people, those with an engineering bent must contribute to all of the broad corporate functions — conception, production, distribution, and maintenance. In conception, the engineering contribution is obvious; the same is true of production. In distribution, the engineering role is to plan the correct use of energy in physical devices, locating and integrating them into the family living pattern. In addition, the engineer will manage the craftsmen who install these into the household system. In maintenance, the engineering role is logical problem analysis, feedback to the conception function, and management of the repair craftsmen.

The end of the story can be summed up this way: A high degree of moral rectitude, coupled with knowledge to define goals; add to this ingenuity and the courage of one's convictions; tie it together with an adequate feedback on the durable goods output — the result — an honorable, reliable service to man.

MARSCO

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Here are some of the applications for Marsco heat-treated, tempered and hardened glass parts:

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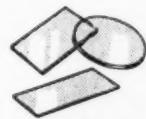
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That's why they use the Ransburg Electrostatic Hand Gun to apply a uniform clear coating on their brass-plated furniture. The protective coating is baked on. Although the bulk of their present production is in the popular brass line, they still paint the metal furniture in a variety of colors with the Hand Gun.



*Painting is CLEANER
...QUICKER...CHEAPER
with the Ransburg Electrostatic
Hand Gun.*



*These chairs and table
are typical of the Koch
line of metal furniture.*

*10 GALLONS OF PAINT NOW DOES THE JOB WHICH FORMERLY TOOK 30 GALLONS

On one item—a TV table—they formerly used 30 gallons of enamel to coat 1000 units by combination dip and air spray method. Now—with the Ransburg Electrostatic Hand Gun, they paint 1000 tables with only 10 gallons. And, they get a better, more uniform coating, too.

NO REASON WHY YOU CAN'T DO IT, TOO!

See how the Electrostatic Hand Gun can save time...paint...and cut costs in YOUR finishing department. Or, if your production justifies, it'll pay you to investigate Ransburg's automatic electrostatic spray painting equipment. Write for our No. 2 Process brochures which show numerous examples of modern production painting in both large and small plants.

RANSBURG
Electro-Coating Corp.
Box-23122, Indianapolis 23, Indiana

Editor's Mail

→ from Page 8

this income must be raised! But, by which means? By raising prices? Moving to cheaper labor markets? Lowering quality? Better manufacturing facilities? Automation? Yes, maybe all of these methods must be employed, but the thought that has been plaguing me is the unscrupulous methods that have been employed by some of the country's most respected companies. Their buying tactics have most all of their vendors in fits.

Products from reputable vendors have been given the onceover by so-called "Reduce Cost Programs," "Analysis of Values," and "Vendor Conventions," etc. Suppliers' parts have been scrutinized, harrassed, and ridiculed. Industries are paled against each other, Metal, Plastic, Paper, Glass, for the constant search of lowering cost and reducing quality standards. All reputable vendors feel that the American economy is built on a "Profit Basis," not on an overhead carrying basis.

The biggest thing we have in America is the desire to sell ourselves. We don't do so well with the Hottentots buying refrigerators, air conditioners, or colored TVs, but we do pretty well in New York, Chicago, Los Angeles, and Kokomo. Why? Because all these people have the desire for these products and are paid wages enabling them to buy. However, if we can keep on evaluating costs by placing our parts business amongst the Hottentots with no regard to their lower living standards, habits, and desires to buy our manufactured products, then we are riding for a fall and the overall lowering of our living standards, now the highest in the world. Why have we had the tremendous influx of foreign cars, that certainly are lowering our riding habits? It is because we have not given equal value for our earned dollar to our car buyers.

Many consumer goods have been cheapened by parts manufactured by Hottentots, alley shops, and overhead-carrying jugglers who cannot and care not to give "Service after the sale."

Claus M. Wiedemann
Mariemont Center Building
Cincinnati, Ohio

The coated steels

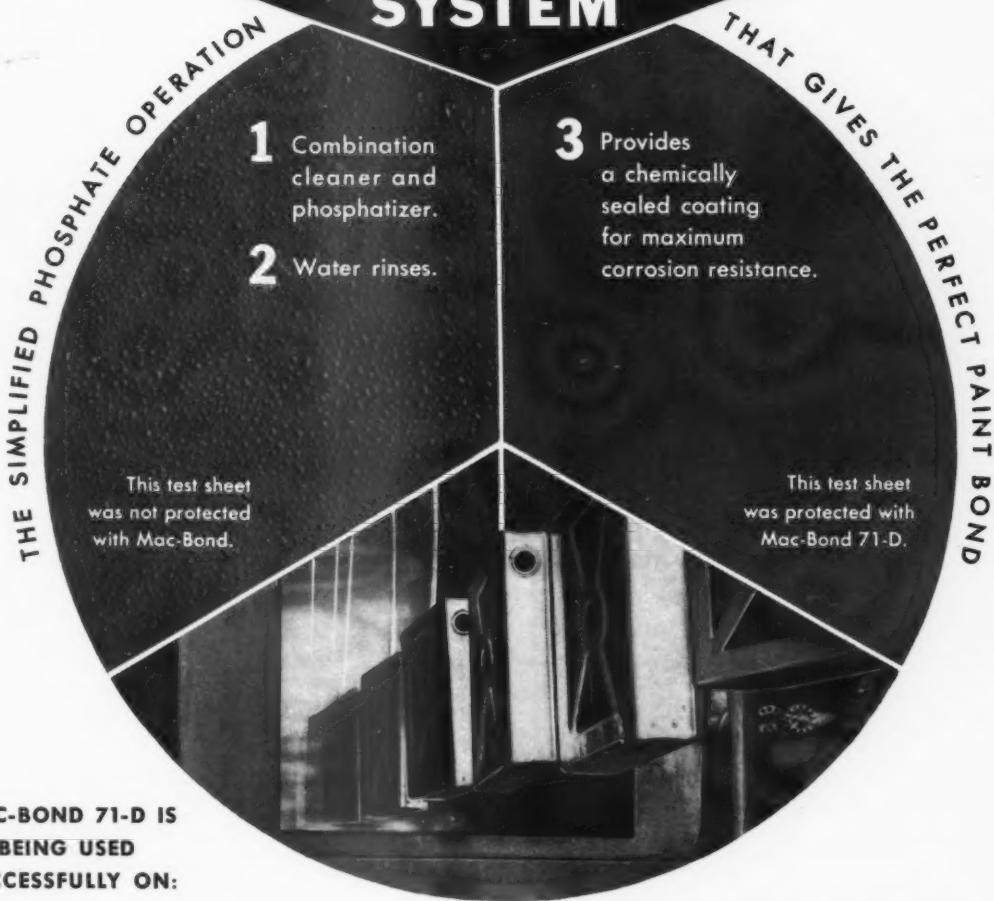
Gentlemen: We have read with a great deal of interest an article entitled "The coated steels" in the January issue of your journal Metal Products Manufacturing.

We would greatly appreciate it if you would send us four sets of tear sheets on both Part I which appeared in the January issue, and Part II which appeared in the February issue.

T. R. Miller, P. Eng.
Ass't. Product Design Engineer
Trans Co. of Canada, Ltd.
Toronto, Ontario, Canada

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PHOTOGRAPH BY JOS. R. CAVALLO

VIRGINIA HABERMAN • MRS. HOME LAUNDRY QUEEN • 1960

MPM names 4th Mrs. Home Laundry Queen

VIRGINIA HABERMAN is MPM's selection as the 1960 Mrs. Home Laundry Queen. An entry of the Speed Queen Div. of the McGraw-Edison Co., Virginia takes over the throne from the 1959 Queen, Kay Thomas, who also represented Speed Queen.

This is the fourth consecutive year MPM has named a Home Laundry Queen to tie in with the national AHLMA meeting. This year's meeting will be held April 27-29 at the Diplomat Hotel, Hollywood-by-the-Sea, Fla.

The Queen was chosen from a group of entries whose pictures were submitted by manufacturers for publication in the special Home Laundry section of the September, 1959 issue. The 1960 Queen will receive a matched Speed Queen automatic washer and dryer from MPM.

THE QUEEN

Born and raised in East Aurora, N.Y., 25-year-old Virginia Haberman presently resides with her husband, Larry, in Oshkosh, Wis. She graduated from the University of Wisconsin in 1956, where she majored in speech, theatre and television. While in college, she had her own television show, "Reflections of Youth," and she also began modeling to help earn her way through school.

Virginia was a Trans World Airline hostess from June, 1956 to April, 1957, when she married Larry, who now works for the Wisconsin Telephone Co. She started modeling in Milwaukee in the summer of 1957, and was hostess on the "Panorama Milwaukee" television show from August, 1957 to January, 1958. She has done modeling and fashion show work since then.

Currently, the Queen is treasurer of the Milwaukee Society of Models. She also takes an active part in helping mentally retarded children. She lists her primary occupation as "housewife," the modeling work being only a part-time interest. Her hobbies are "coffee klatching," long, leisurely weekends with her husband, playing the piano, training and showing dogs for obedience trials, and theatre work at the Fred Miller Theatre in Milwaukee. In a recent play she had the female lead opposite Robert Q. Lewis.



Virginia Haberman, 1960 Mrs. Home Laundry Queen, in the picture which won her the title. She is shown with the 1960 Speed Queen automatic washer and dryer. This picture, along with the pictures of Queen contestants entered by other home laundry manufacturers, appeared originally in the September 1959 MPM.

An accomplished model, the 1960 Queen has also appeared on the stage and television in the Milwaukee area. Her current full-time interest is keeping house for her husband, Larry, but she also finds time to work with mentally retarded children and serve as treasurer of the Milwaukee Society of Models. MPM is presenting the Queen a 1960 Speed Queen automatic washer and dryer.



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Lock paint on...lock corrosion out: ALL Oakite CrysCoat processes do both by converting a steel surface into an integral "toothed" layer of rugged phosphate crystals. Yet they're different enough to let you *job-match* a pre-paint treatment to the product service conditions and to your production setup—for *lowest unit costs*.

There's a spray-wash or tank immersion phosphate treatment for saving on heating costs...for easy control...for faster production...for smoother paint films...for heavy duty protection. Pick the ONE that's right for you.

Oakite CRYSCOAT 47: heavy, fast-coating iron phosphate. Iron phosphating at its best. Cleans off average fabricating oils and soils as it phosphates; produces a premium quality coating. Increases corrosion resistance. Conserves spray washer time. Bulletin F-10058C.

Oakite CRYSCOAT 87: smooth, paint-saving iron phosphate. Spray setup uses only 3 stages. Saves time, equipment; easy to control. Doubles the 250 hour specified minimum of salt spray resistance. Bulletin F-10300.

Oakite CRYSCOAT 187: NEW—iron phosphate treatment. Specifically designed for application by tank immersion. Provides new detergent and solvent action to assure greater cleaning efficiency...more thorough removal of smut from steel. Has built-in pH control. Offers longer solution life.

Longer-lasting: These two panels were identically painted; scored with an "X" and exposed to salt spray test for 480 hours. The big difference: right-hand panel was first treated with an Oakite CrysCoat iron phosphate coating.

Better-looking: This tubing was CrysCoated, painted, and then subjected to repeated punching. Despite the severe abuse, paint film still grips tight—still looks good.

Oakite CRYSCOAT 89: economical, iron phosphate. Works in spray washing machine without foaming. Easy to control, requires no stainless steel equipment. Bulletin F-10301.

Oakite CRYSCOAT HC: heavy duty zinc phosphate. For tank application. Creates a heavy zinc phosphate coating for severe service conditions. Exceeds the 150 milligram per square foot requirement; up to 1200 milligrams obtainable. Bulletin F-10305.

Oakite CRYSCOAT SW—single package zinc phosphate. No outside accelerators needed. Easy to control. For spray washer or tank application. Coatings meet Government specification MIL-C-490A Grades I and III. Offers long solution life. Bulletin F-10309.

Oakite CRYSCOAT MP—heat-saving zinc phosphate. Produces zinc phosphate coating at low temperature, on steel cadmium and zinc. Keeps sludging to a minimum. For spray washer or tanks. Bulletin F-10768.

Oakite CRYSCOAT FG—smooth, dense zinc phosphate. Develops a fine grain zinc phosphate coating. Spray washer or tank immersion. Low to moderate temperature process. Promotes a smooth paint finish. Bulletin F-10767.

The local Oakite man offers his technical service on a local basis—promptly. There are 250 like him—experienced in all phases of phosphating and its benefits. Call him in, or write for the bulletins mentioned under each process description. Oakite Products, Inc., 17 Rector Street, New York 6, N. Y.



Electric heating: what, where and how

AN MPM STAFF FEATURE

heat pump leads the way in boosting popularity of electrically heated homes

TEN YEARS AGO, electricity was struggling for recognition as a legitimate member of the family of heating fuels. Its main adversary was tradition — the idea of heating a home with electricity was strange to the public, and a strange idea is accepted slowly at best.

Also, as most manufacturers of electric heating equipment are ready to admit, the cost of heating with electricity was, and in most cases still is, higher than traditional heating methods. So the job was to acknowledge the cost factor and concentrate on educating the public to the advantages of electric heating. "You may pay more but you get more," was the theme.

Today, electric heating equipment manufacturers and electric utility companies are continuing the campaign on behalf of electricity as a heating fuel, and they have succeeded to the extent that an estimated one million homes in the United States are heated electrically.

Of course, convincing people that a flame is not necessary to produce heat was not the whole problem. Manufacturers had to develop new, more versatile equipment to meet the demands they were creating for electric heat. The equipment had to be carefully selected to meet the requirements of the particular home and geographical location.

Electricity is now a solid "junior member" of the family of heating fuels, and further progress appears certain. Its exact status in the coming years depends on the degree of public acceptance, the improvement of existing methods, and the innovation of new electric heating ideas. Probably the major consideration in weighing the future of electric heat is cost. Intelligent promotion can stress the functional virtues which may make electric heat desirable to the consumer, but the economics of the subject cannot be ignored. The electric heat industry's task will be easier when and if the cost gap between electricity and fossil fuels is narrowed.

This discussion of comparative costs is a generality. In some areas, because of climate and favorable utility rates,

electricity competes cost-wise with other fuels. Some utility companies are offering reduced rates for homes heated entirely electrically. This is done in hopes of boosting the winter power consumption which ordinarily falls far below the peak summer usage.

Many electric heating units have a lower original cost than other heating equipment, and it is generally accepted that maintenance requirements on electric heating systems are slight. If a home is properly insulated, equipped with the correct heating unit or units, and most important, if the power rate is favorable, the cost of heating a home electrically can approach or equal the costs of other heating methods.

Thus a blanket statement that "electric heat costs more," though generally true, must be tempered by a consideration of particular cases.

Electric heating principles

Competition among manufacturers of various types of electric heating equipment approaches the intensity of the fossil fuel-electricity debate. All that can be done in this general survey of the industry is to present objectively the applications and operating theories of the various types of equipment currently on the market. Another section of this article deals with specific models of electric heating equipment and some of their components.

There are four basic principles covering the transfer of heat: conduction, radiation, convection, and forced convection.

Conduction: This is the transfer of heat through matter. When heating one end of a metal bar, the heat travels progressively to the other end by conduction transfer. If a hot iron were placed in direct contact with a cold iron, the transfer to the cooler body is by conduction. Conduction transfer occurs in solids, to some extent in liquids, and to an almost negligible degree in air or gases.

Radiation: Radiant energy travels in straight lines until intercepted or ab-

sorbed by some body or object and converted to heat. It behaves in the same manner as light. To a degree, it will pass through glass without perceptibly heating the glass. Air containing water vapor or dust will intercept and absorb radiant heat. It is in this manner that the atmosphere receives part of its heat by radiation from the sun.

Convection: This transfer is defined as a transfer of heat or thermal energy in fluids (liquid, gas or air) when relatively warm particles are mixed with cooler ones. Using the familiar heated radiator as an example, the air around the radiator becomes warm, expands with a resultant decrease of density, and rises to be replaced by cold air, setting up a natural circulation in the room. Any heating surface (in electric heaters the resistance coil, the grille, a flue-type heated surface, or the reflector) becomes a convactor. Convected heat becomes a convector. Convected heat serves to warm cooler objects by coming in contact with them. Any surface that has been heated by radiation to a temperature above surrounding air temperature becomes a convector.

Forced convection: This is the same basic convection heat transfer accelerated by use of a fan. Since more air is moved directly over the source of heat, the heat is literally extracted from the heat source.

Types of systems

Electric heating systems can be classified by the following types: electric furnaces; electric boilers; electric duct heating; radiant panels; convection heaters installed in walls with either gravity or forced fan circulation; baseboard units; unit resistance heaters suspended from ceilings or walls; and heat pumps.

Electric furnaces are used in essentially the same way as central heating systems fired by fossil fuels. It differs mainly in that electric power is used as the heating energy or fuel. Warm air is delivered through ducts to the areas to be heated. Some units, by installation of

a cooling coil, can be converted to serve as a central air conditioner in the summer months.

Another type of electric furnace stores heat generated during off-peak periods during which utilities may charge lower rates.

Electric boilers use pipes and some form of radiator filled with either steam or hot water for delivering heat from an electric boiler. The boiler principle is the same as that employed with oil, coal, and gas.

Floor furnaces include those devices that recess beneath the floor and discharge warm air level with the floor or through registers in a wall.

Electric duct heating consists of units installed directly in the air distribution of a self-contained or remote air conditioner. The use of individual room duct heaters located immediately before the outlet diffuser in the room and controlled in the room by a separate thermostat allows room-to-room flexibility.

Radiant panels include all those that heat large areas of ceiling, floor, or wall. Heating systems using resistance cable embedded in plaster ceilings or cement floors can also be included in this classification.

*Convection heaters** installed in walls with either gravity or forced fan circulation were originally manufactured as wall insert units for bathrooms and isolated rooms, but today they are avail-

able in a variety of styles. In the radiant-type of convection heater a ceramic tube is employed to support the resistance coil and create an additional convecting surface in the form of a heated chimney. Objects within the scope of radiation are warmed.

With forced-convection heaters a fan is used to force air over the heating element. In a heater of this type, transfer is almost entirely by convection.

Baseboard heating units employ a large amount of radiant plus convection transfer. The heating element of a metal baseboard unit is mounted horizontally, and is generally of a finned-type construction to increase the convection transfer.

Unit resistance heaters are available for use as heaters suspended from walls or ceilings. Portable units are also available to meet special needs.

The *heat pump** is the "hottest" item in the electric heat field. Where extreme climate differentials do not prevail, the heat pump, with its ability to heat and cool, is a growing method of year-round air conditioning. The biggest acceptance of heat pumps to date has naturally been in the southern portions of the country, where severe winters are not the rule. However, some manufacturers believe the heat pump, with proper auxiliary heating, is ready for application in most areas.

(See "Electric space heating makes its bid," Page 37, June, 1957 MPM).

Florida has been the most lucrative state for heat pump manufacturers. About 30 per cent of all central heat pumps now installed in the United States are in this state. It is estimated that by 1962 Florida will have 160,000 room unit heat pumps and 50,000 central units.

In general, 62 per cent of heat pump sales are going residential; the remaining 38 per cent go into commercial and industrial applications. Military housing is a large factor in heat pump growth, and military experience will have a significant bearing on general acceptance of the year-round equipment.

Commercial installations

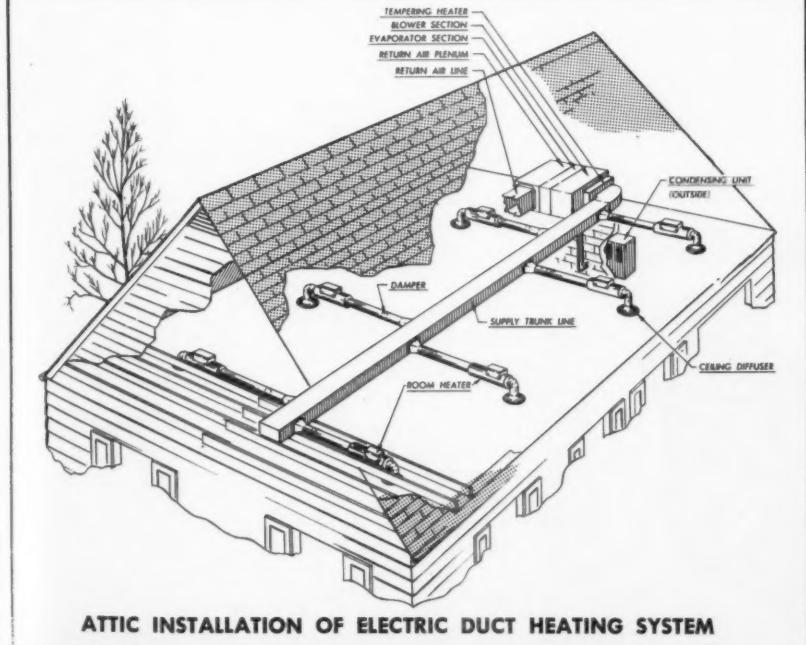
Commercial applications of heat pumps have been particularly encouraging to the industry. What is reported to be the largest heat pump system in the world was recently installed in the new head office of the Australian Mutual Provident Society, Sydney, Australia. The system includes one 200-ton and two 600-ton centrifugal compressors in the 26-story, H-shaped building, which is the tallest skyscraper in Australia. The units will supply 1,400 tons of summer cooling and 10,000,000 Btu/hr of winter heating.

In the summer, the condensers are supplied with 4,500 gpm of sea water, which is pumped from the harbor of the AMP building through a 300-foot tunnel. In the winter, the system uses the reverse cycle method by extracting heat from the harbor water through the intermediary of salt water-fresh water heat exchangers. The distribution of the heat throughout the building itself is accomplished by hot water circulated through coils installed around the perimeter of each floor. In the summer, these coils are supplied with chilled water.

Other commercial buildings have recently been equipped with heat pumps. The new airborne electronic equipment engineering laboratory for Raytheon Co.'s Government Equipment Div., Sudbury, Mass., utilizes an air-to-air system. An air-source heat pump supplies cooling and heating to the circulating air and water systems in the seven-story office building of the Indiana & Michigan Electric Co., South Bend, Ind. A new three-story office building of the St. Louis Shipbuilding Co., St. Louis, Mo., is heated and cooled by a 78-ton heat pump.

Some utility companies are making
to Page 93 →

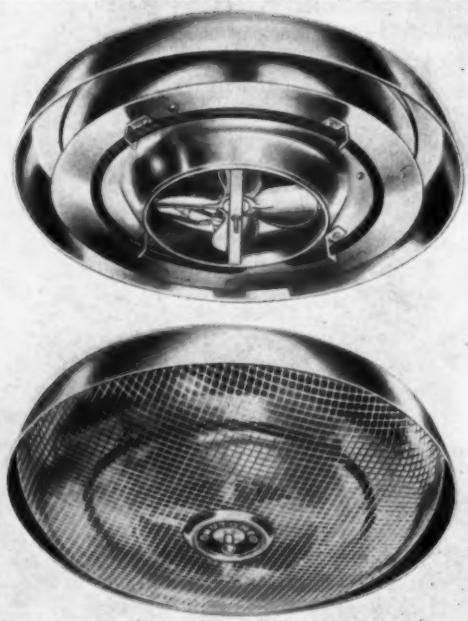
turn page for latest designs
in electric heating equipment →



Latest designs in



Model HP36 provides automatic year-round heating, cooling and dehumidifying. The unit has twin cooling systems for extra cooling capacity. YORK DIV., BORG-WARNER CORP.



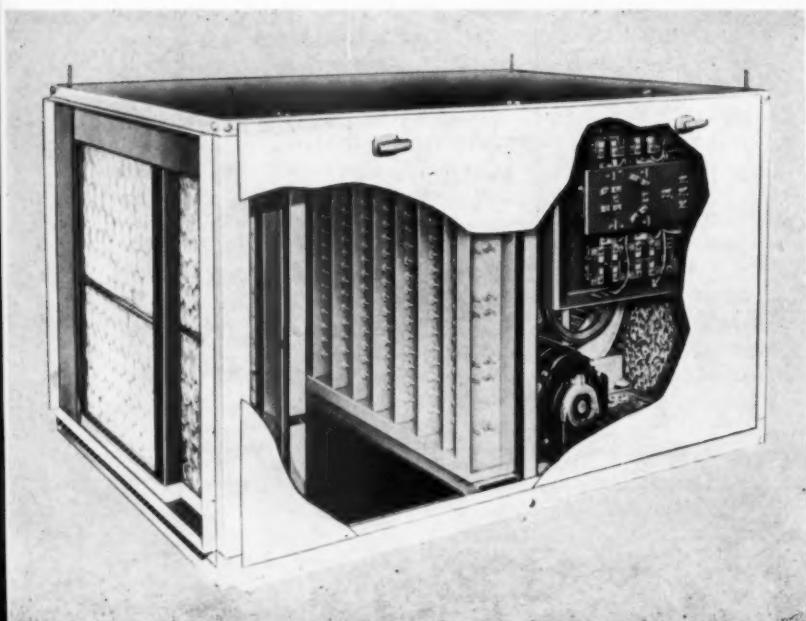
Special grill pattern permits maximum heat radiation and diffusion on new ceiling radiant heater. Exposed parts are anodized aluminum. NUTONE, INC.



Portable electric bowl heater banishes chill and dampness in bedroom or bath. It has a 13-inch reflector. SILEX CO.



(Right) — Counter-flow system of forced air heating unit reheats warm air that has risen to the ceiling and recirculates it through the lower duct. The temperature is controlled thermostatically room-by-room. ELEC-TREND PRODUCTS CORP.



(Left) — New electric furnace can be adapted to central air conditioning by placing a cooling coil directly into the casing. Four 6-kw heating elements are energized and de-energized by a four stage sequencer control. MUELLER CLIMATROL.

Electric heating

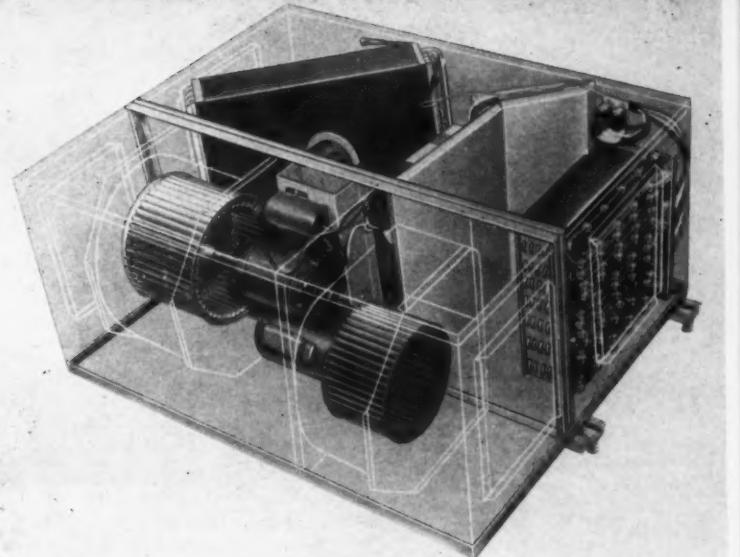


This combination heater and fan features a new innovation—four-direction air flow, made possible by a four-section grill. ROWENTA METALLWARENFABRIK, GMBH, GERMANY.



(Left) — Electric forced-air furnace circulates and filters, as well as heats the air. Electric cabinet section is mounted on top of the blower filter section. LENNOX INDUSTRIES, INC.

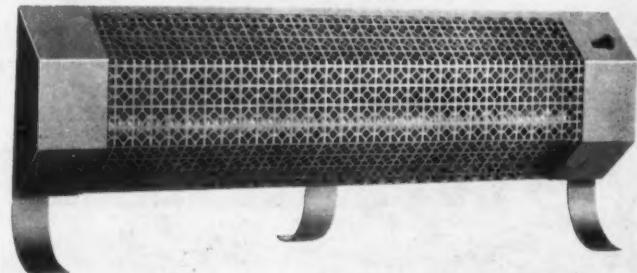
(Right) — Automatic electric heater has a 360-square-inch reflector, a safety tip-over switch, and a safety grill. A centrifugal blower circulates air. GENERAL ELECTRIC CO.



Custom HE-936B is a 3-hp heat pump with a cooling capacity of 36,000 Btu/hr and a heating capacity of 62,700 Btu/hr at -10° F. Supplementary heat source consists of three stages which operate when the room thermostat demands it. FEEDERS CORP.

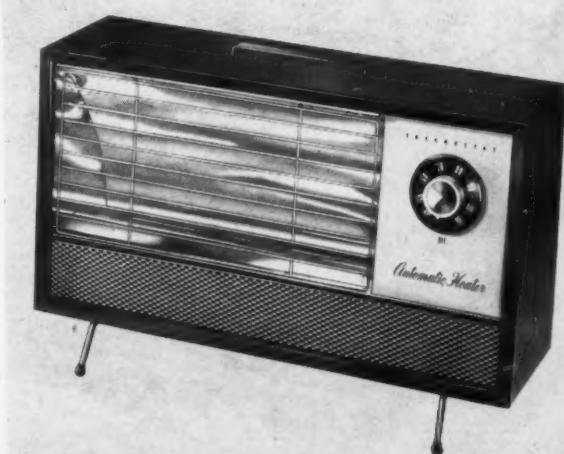
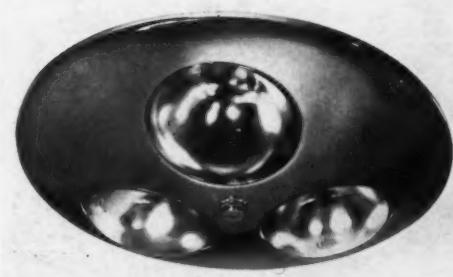
This "desk heater" is designed to be placed in the knee space of a desk to provide individual comfort. It can be plugged into any 115-volt outlet.

SEABOARD PRODUCTS CORP.



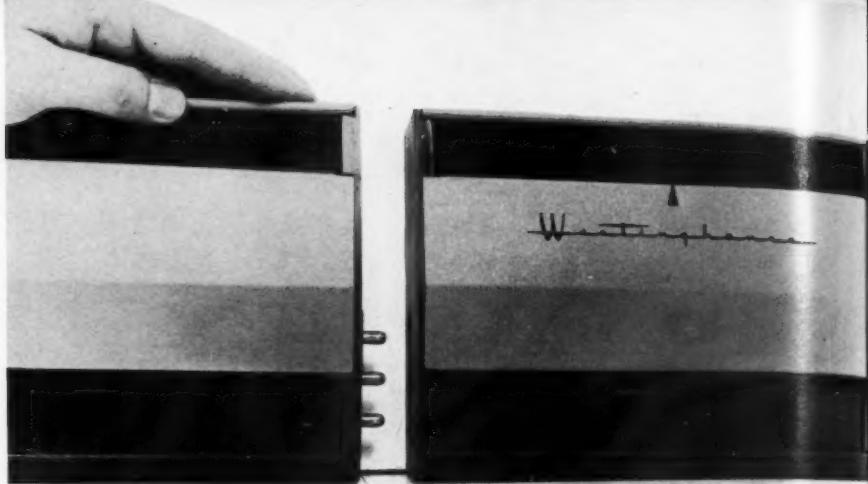
more equipment on following pages →

Model 5003 recessed "people heater" is a 250-500-750-watt infra-red model. It installs in the ceiling and is wired for one, two or three-lamp control if individual switching is desired. Chrome fronts are available. EMERSON PRYNE CO.





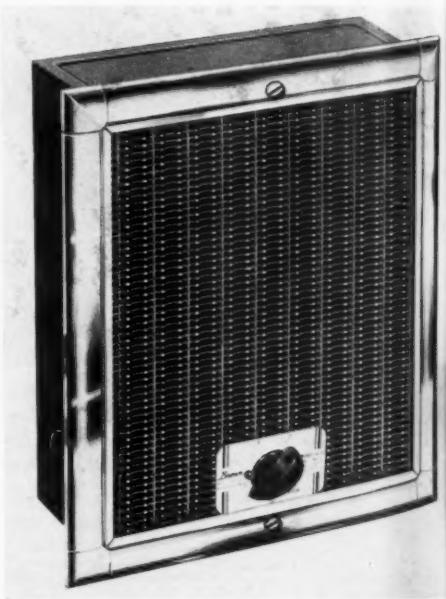
Electricity is used to keep the circulating hot water at the right temperature in this room heater. Water and anti-freeze solutions are sealed in. INTERNATIONAL ELECTRIC HEAT DIV.



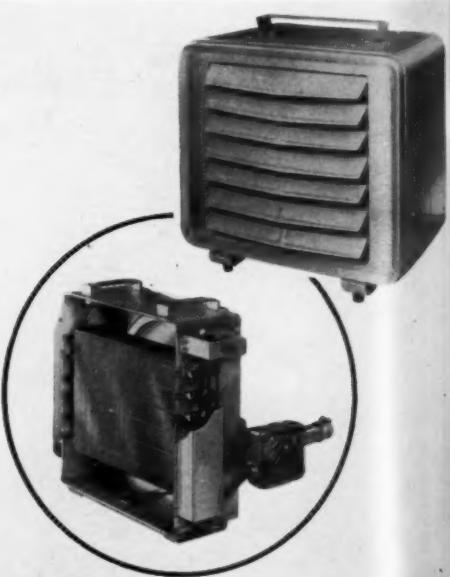
(Above) — A new line of baseboard electric heating equipment features modular plug-in sections for quick installation. WESTINGHOUSE ELECTRIC CORP.

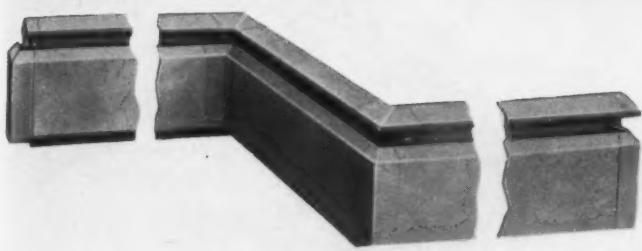
Heat pump for commercial and industrial applications uses remote air heat exchanger with free standing, free discharge coil blower unit. No duct work is needed. THE MATHES CO.

(Right) — Fan-type wall heater is thermostatically controlled. Unit is said to heat in less than ten seconds. BROAN MFG. CO., INC.

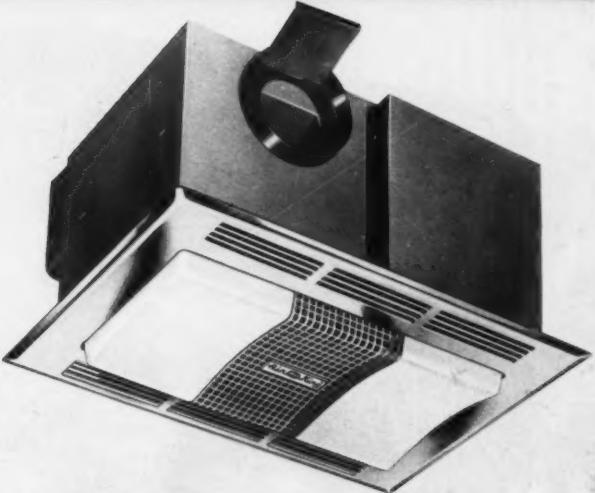


(Below) — A stainless steel finned sheath heating element is the big feature of this fan-forced unit heater. Capacities range from 2 to 10 kw. MARKEL ELECTRIC PRODUCTS.

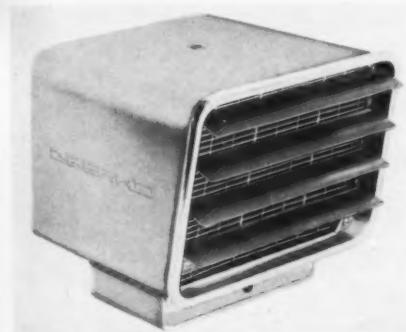




Baseboard heater can be flush-mounted or recessed against studding. Blank panels and corner sections allow wall-to-wall coverage. Individual thermostats provide room-to-room temperature control. Phosphated finish on the panels requires no priming. ILC ELECTRIC VENTILATING CO.



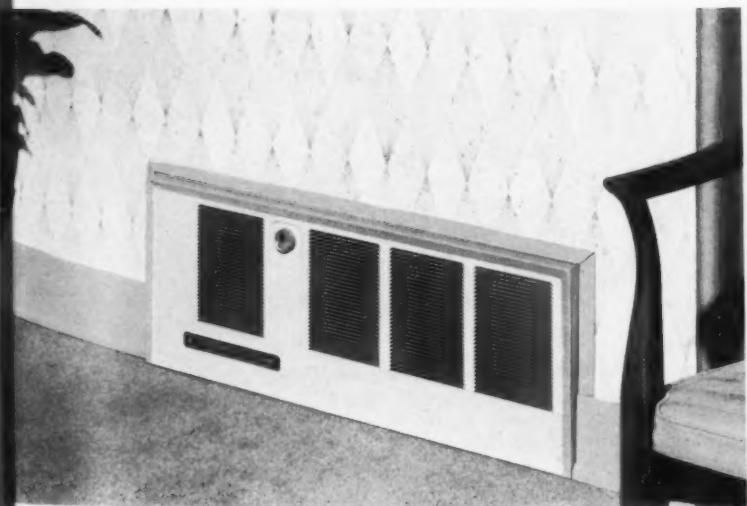
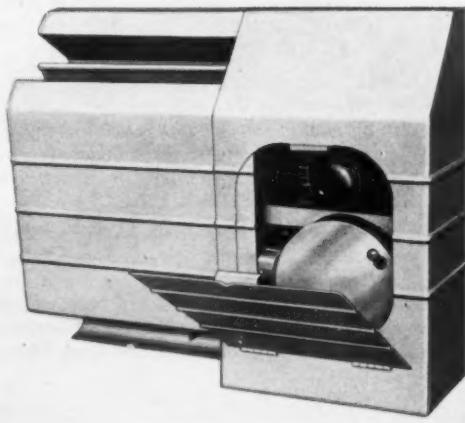
Fan-forced heater, exhaust fan and light in one unit. A special wall switch allows individual control of each function. Frame swings out for easy bulb changing. BERNS AIR KING CORP.



more equipment
on following pages →

The construction of this heater permits the removal of all internal components as a unit. BERKO ELECTRIC MFG. CORP.

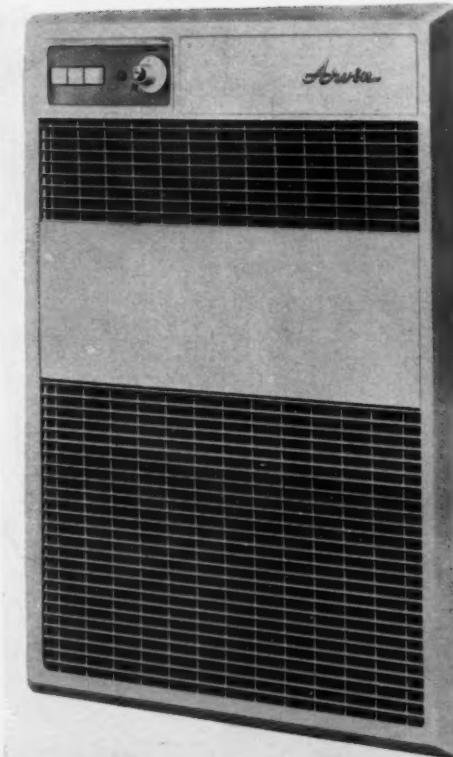
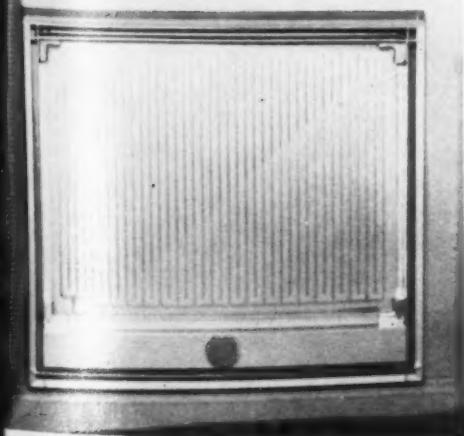
Available in 4, 6, and 8-foot lengths, this new baseboard heater requires only 220 watts per lineal foot. It operates on 115, 208 or 230 v. RADIANT-RAY CORP.



(Above) — Forced-air baseboard heater requires no duct work. Blower and motor are concealed behind grill. ROBBINS & MEYER, INC.

(Left) — Electric glass heat panel is said to be ideal for apartment dwellers, rented offices and motels. DIXIE RAYDIANT ELECTRIC HEAT CORP.

(Right) — A new ultra-thin baseboard heating unit is said to be as safe as an electric light. Every section of the unit has a safety limiting thermostat. ARVIN INDUSTRIES, INC.





Automatic portable room heater features a double-pole thermostat and a safety cut-off switch. ELECTRIC HEATER DIV., MARTIN STAMPING & STOVE CO.

(Right) — Thermostatically controlled heater features automatic safety cutoff, enclosed rod-type elements, on-off signal light, and a chrome-plated safety guard. Portable heater plugs into any outlet. DOMINION ELECTRIC CORP.

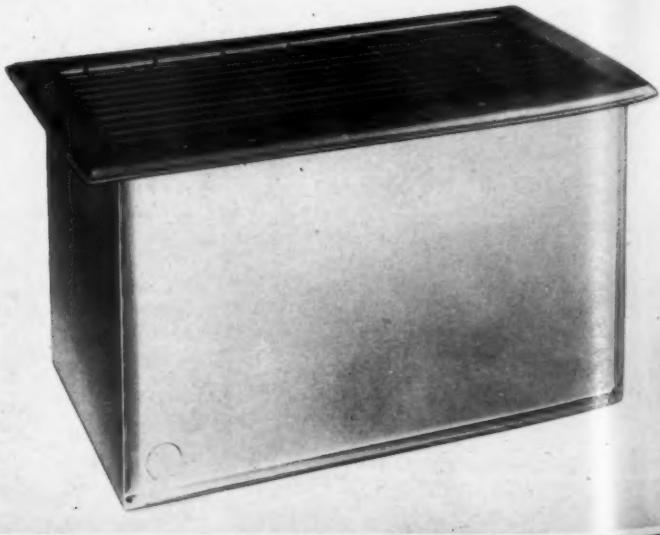
(Below) — This company offers wall insert heaters in four sizes ranging in input capacities from 1,500 watts to 4,000 watts. The heaters are designed to fit between two-by-four studs, and can be used for entryways, living rooms, bedrooms and recreation rooms. A forced air fan and built-in thermostat are other features. CARRIER CORP.

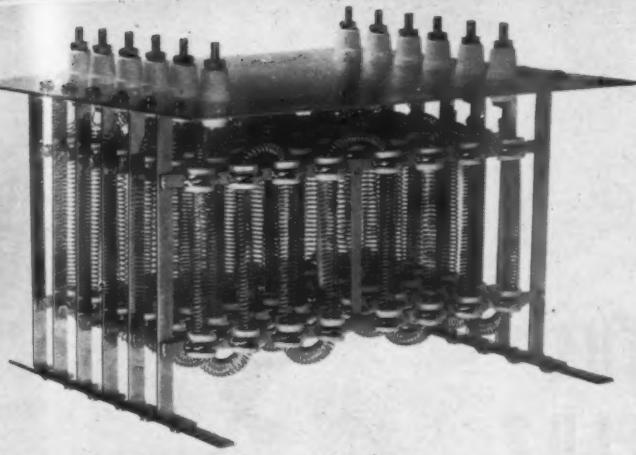


Reflector design of ceiling heater allows the appeal of glowing radiant heat while the fan provides air movement behind the reflector. Grill and reflector are of anodized aluminum. THERMADOR ELECTRICAL MFG. CO.

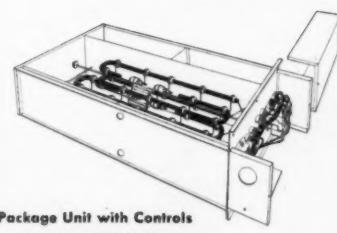
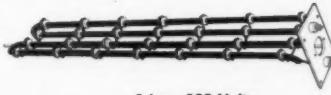
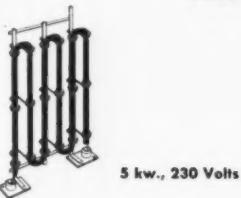
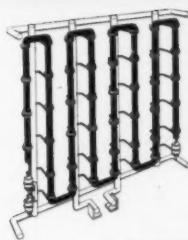


Floor insert heaters can be installed adjacent to picture windows, sliding glass doors, at the base of open stair wells, or on the inner side of exterior doors. Unit is lifted out for cleaning. ELECTROMODE DIV., COMMERCIAL CONTROLS CORP.





(Left) — "Stacked" heating unit consisting of six independent 3,000-watt coils mounted on a common frame. The coils may be used individually or in any combination. This heating unit may be used as a supplementary heat source for a heat pump or as the heat source for forced-air heating units. Recommended wattage is 40-50 per square inch of wire surface area. TUTTLE ELECTRIC PRODUCTS, INC.

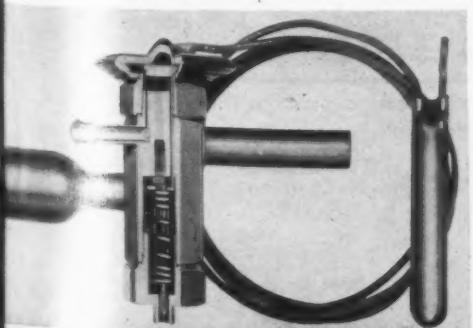


Electric heating components

Snap-acting, fixed-temperature thermostat is used as safety high-limit control for overheat protection of electrically energized baseboards. Another application of the thermostat is in the supplementary heater of a heat pump, which may overheat in the event of fan failure. The thermal actuating element in the thermostat is a snap-acting disc, which may be enclosed or exposed. Enclosed disc types have the switch assembly, thermal disc, movable contact arm, and electrical contacts enclosed within a stainless steel cup, providing protection from dirt and dust. Exposed disc types have the contacts enclosed, but the disc is exposed to provide faster thermal response when necessary. METALS & CONTROLS CORP., DIV. OF TEXAS INSTRUMENTS, INC.

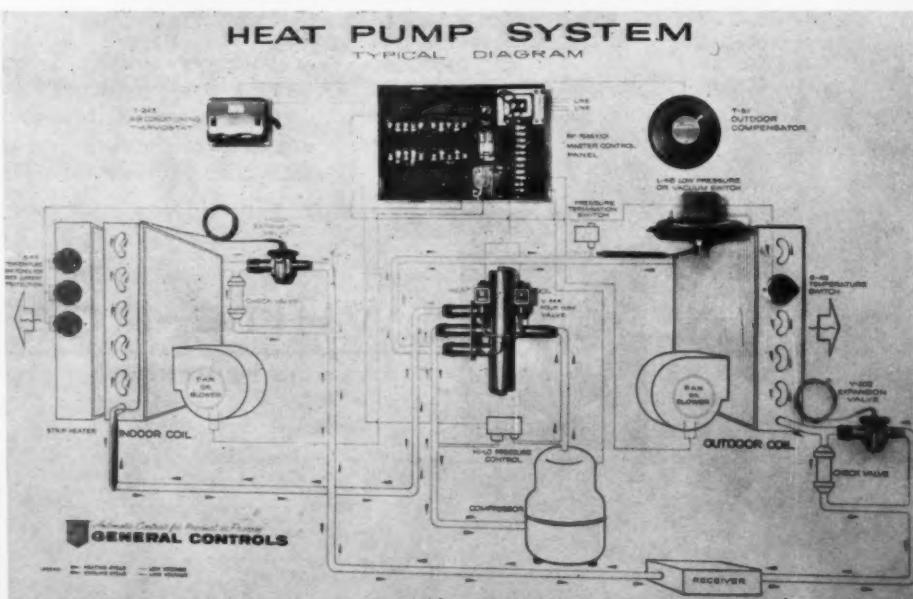


(Below) — "Flat-top" thermostatic expansion valve is said to be capable of withstanding one million life cycles on standard refrigeration and air conditioning applications and over 100,000 life cycles of extreme pressure fluctuations incurred during heat pump reversals. The unit derives its "flat-top" name from its unique head design that controls the diaphragm flexing. During the refrigeration cycle, the diaphragm is supported by a minimum arc head piece, eliminating bending and metal fatigue. CONTROLS CO. OF AMERICA.



(Above right) — Supplementary heaters designed to give a boost to the output of a packaged air-to-air heat pump during peak demand periods. Single and multi-stage units with and without controls are available. H. W. TUTTLE & CO.

(Below) — A line of seven control components for heat pumps include the following items: T-243 thermostat designed for accurate control of reverse cycle air conditioning; T-51 outdoor compensator based on a current regulator which is said to be especially sensitive to small temperature changes; V-444 four-way refrigerant transfer valve for automatic reversing of the heating-cooling cycle; V-205 expansion valves with selective external or internal equalizer connection; RP-7536X101 master control panel including compressor and strip heater; L-48 low-pressure or vacuum switch for initiating defrost cycle; and S-43 temperature switches for step selection of strip heaters. The components are available singly or as a package. AIR CONDITIONING CONTROLS DIV., GENERAL CONTROLS CO.



THINKING OF ENTERING THE ELECTRIC HEAT FIELD?

Then you should know...



TYPE 1A61
World's Largest Seller

TYPE 1A65
Elegant New Companion

The Industry's Standard of Beauty And Performance

**IN ELECTRIC HEAT
THERMOSTATS...
WHITE-RODGERS
IS THE LEADER!**



Easily attached thermometer now available at slight additional cost.

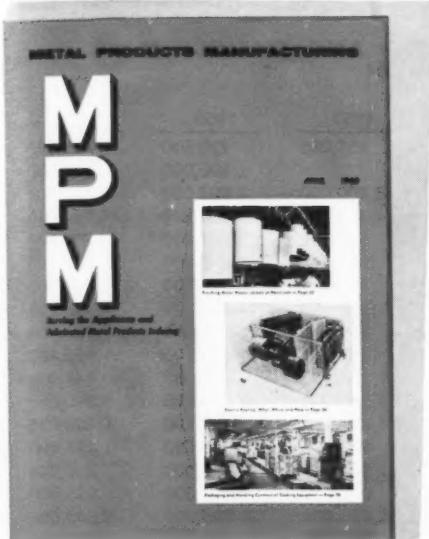
More than 50 electric heat equipment manufacturers put their brand names on White-Rodgers 'stats . . . using several times more than all other makes combined.

If your organization is considering electric heat, as a possible new product, we at White-Rodgers offer you the experience gained through leadership to assist you with any control problem you may encounter. Our technical staff is at your service . . . just write us.



WHITE-RODGERS

ST. LOUIS 6, MISSOURI TORONTO 8, CANADA



The year 1959 proved to be a very good year for the appliance and fabricated metal products manufacturing industry. Substantial increases in production and sales were registered in all but one segment of the industry. Industry spokesmen are looking to 1960 with conservative optimism. It is felt that further gains will be made, but to a lesser degree than in 1959.

Seventh annual market and statistical review of the appliance and fabricated metal products manufacturing field

SUMMARY—FACTORY SHIPMENTS AND/OR SALES

(Typical segments only — data not available for many products)

Product	1954	1955	1956	1957	1958	1959
Air Conditioners, Room & Central.....	1,514,113	1,472,361	2,082,450	1,803,136	1,903,541	2,127,000
Electrical Appliances.....	72,475,700	82,009,600	96,923,900	89,685,500	79,701,300	88,861,630
Gas Appliances.....	8,967,606	11,081,857	10,669,626	8,984,700	8,280,540	9,114,733
Home Laundry Equipment*.....	4,388,000	5,620,900	5,946,600	5,139,700	5,042,900	5,409,000
Plumbing Fixtures.....	5,841,017	6,594,644	6,001,302	5,261,791	5,761,913	6,855,915
Steel Kitchen Cabinets.....	3,372,000	4,046,000	3,000,000	2,490,000	2,000,000	1,350,000
Steel Shipping Barrels, Drums & Pails.....					103,669,545	114,242,603
Typewriters.....						1,282,674
Total Units.....	96,558,436	110,825,362	124,623,878	113,364,827	206,359,039	229,243,555

* (1954 to 1956 domestic only. Subsequent years, domestic and export.)

ELECTRICAL APPLIANCE SALES—INCLUDING RADIO AND TELEVISION

Manufacturers Sales

Product	1954	1955	1956	1957	1958	1959
Blenders.....	296,000	405,000	480,000	455,000	430,000	455,000
Can Openers.....					300,000	805,000
Clocks.....	6,900,000	7,200,000	9,750,000	8,400,000	7,800,000	8,100,000
Coffee Makers.....	3,269,000	3,675,000	5,100,000	4,365,000	4,250,000	4,750,000
Corn Poppers.....	815,000	780,000	640,000	550,000	595,000	705,000
Dehumidifiers.....	80,000	96,000	275,000	225,000	210,000	255,000
Dishwashers.....	215,000	295,000	400,000	390,000	424,700	547,300
Fans.....	6,880,000	5,585,000	6,865,000	5,303,000	4,445,000	4,340,000
Food Waste Disposers.....	410,000	520,000	610,000	550,000	616,500	788,600
Freezers.....	990,000	1,100,000	975,000	925,000	1,100,900	1,205,400
Fryers, Deep Fat.....	1,693,000	1,925,000	1,450,000	1,100,000	440,000	345,000
Frypans.....	1,100,000	2,660,000	6,100,000	5,200,000	3,750,000	3,390,000
Heaters, Total.....	1,432,000	1,680,000	1,903,000	1,855,000	1,965,000	2,180,000
Fan Forced.....	850,000	880,000	976,000	925,000	1,025,000	1,125,000
Non Fan Forced.....	257,000	270,000	320,000	295,000	270,000	230,000
Wall Type.....	325,000	530,000	607,000	635,000	670,000	825,000
Heating Pads.....	1,672,000	1,980,000	2,215,000	2,055,000	1,995,000	2,560,000
Hotplates.....	946,000	950,000	760,000	660,000	610,000	585,000
Irons.....	6,536,000	7,930,000	8,505,000	7,625,000	5,740,000	6,330,000
Lawn Mowers, Power.....	1,750,000	2,750,000	3,200,000	3,300,000	3,452,000	4,200,000
Mixers.....	2,865,000	3,240,000	4,245,000	3,600,000	2,765,000	3,175,000
Polishers, Floor.....	325,000	375,000	415,000	595,000	725,000	1,090,000
Phonographs & Record Players.....	2,783,000	3,006,000	4,101,000	4,872,000	4,095,500	4,275,000
Radios (Production).....	6,276,000	7,269,200	8,461,000	9,009,000	8,032,000	10,245,000
Ranges, Total.....	1,350,000	1,600,000	1,585,000	1,365,000	1,354,500	1,686,800
Free Standing.....	1,250,000	1,400,000	1,200,000	940,000	810,100	933,800
Built-In.....	100,000	200,000	385,000	425,000	544,400	753,000
Recorders, Magnetic.....	100,000	360,000	400,000	500,000	400,000	500,000
Refrigerators.....	3,600,000	4,200,000	3,700,000	3,350,000	3,116,700	3,785,000
Sharpeners, Knife.....				245,000	355,000	545,000
Shavers.....	3,957,000	4,750,000	6,600,000	6,650,000	6,400,000	6,150,000
Television, B&W.....	7,346,700	7,757,000	7,387,000	6,399,000	4,920,000	6,270,000
Toasters.....	3,457,000	3,565,000	3,980,000	4,000,000	3,300,000	3,744,000
Vacuum Cleaners.....	2,658,000	3,270,400	3,721,900	3,190,000	3,295,000	3,420,830
Waffle Irons.....	928,000	995,000	980,000	895,000	775,000	850,000
Water Heaters.....	806,000	900,000	870,000	800,000	883,500	782,900
Water Softeners.....	312,000	403,000	475,000	507,500	500,000	
Water Systems.....	728,000	788,000	775,000	750,000	720,000	800,000
Total.....	79,475,700	89,009,600	96,923,900	89,685,500	79,701,300	88,861,630

Source: EM Week & Vacuum Cleaner Manufacturers Assn., National Electrical Manufacturers Assn.

COOKING AND HEATING EQUIPMENT—NON-ELECTRIC

Product	1954	1955	1956	1957
Cooking Stoves & Ranges.....	2,207,489	2,509,036	2,276,902	2,105,300
Gas, total.....	1,967,113	2,269,673	2,069,545	1,968,600
Coal & Wood.....	67,897	69,851	58,447	49,700
Kerosene.....	109,973	108,257	88,143	87,000
Domestic Heating Stoves.....	2,278,661	3,017,748	3,040,998	2,840,000
Floor & Wall Furnaces.....	539,894	614,584	491,930	440,000
Water Heaters.....	2,281,100	2,884,104	2,933,919	2,532,300
Oil Burners.....	528,500	650,241	571,105	521,000
Residential.....	494,259	609,639	531,990	470,000
Commercial & Industrial.....	34,321	40,602	39,115	51,000
Warm Air Furnaces.....	1,131,882	1,406,144	1,354,772	704,900
Total.....	8,967,606	11,081,857	10,669,626	9,142,800

Source: Gas Appliance Manufacturers' Assn. and Facts for Industry.

HOME LAUNDRY EQUIPMENT SALES

Factory Sales

<u>Product</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>	<u>1959</u>
Combination Washer-Dryers.....			102,400	179,300	168,400	194,200
Washers, Total.....	3,490,200	4,236,500	4,344,900	3,684,600	3,672,300	3,833,300
Automatic & Semi.....	2,352,800	3,082,400	3,927,800	2,781,800	2,781,000	2,934,100
Wringer & All Other.....	1,137,400	1,154,100	1,117,100	902,800	891,300	899,200
Dryers, Total.....	897,800	1,384,400	1,499,300	1,275,800	1,202,200	1,381,500
Electric.....	661,600	1,016,200	1,167,300*	881,000	823,500	905,000
Gas.....	236,200	368,200	434,400*	394,800	378,700	476,500
Total.....	4,388,000	5,620,900	5,946,600	5,139,700	5,049,900	5,409,000

Source: American Home Laundry Manufacturers' Assn.

* Includes 102,400 combinations—separate data not available.

1954 to 1956 Domestic Only. Subsequent years, Domestic and Export.

AIR CONDITIONERS

(Units Sold)

<u>Product</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>	<u>1959</u>
Room Air-Conditioners.....	1,353,204	1,275,500	1,828,047	1,586,094	1,673,000	1,800,000
Central Air-Conditioning.....	160,909	196,861	254,403	217,042	230,541	327,000
Total.....	1,514,113	1,472,361	2,082,450	1,803,136	1,903,541	2,127,000

Source: Air-Conditioning and Refrigeration Institute and National Electrical Manufacturers Assn.

GAS APPLIANCES

Factory Shipments

<u>Product</u>	<u>1958</u>	<u>1959</u>
Boilers.....	123,200	136,200
Conversion Burners.....	142,000	156,300
Direct Heating Equipment.....	1,395,900	1,463,100
Floor Furnaces.....	97,500	97,000
Furnaces.....	853,700	1,046,700
Incinerators.....	51,800	44,300
Ranges, Total.....	1,896,500	2,016,900
Ranges, Free-Standing.....	1,665,000	1,661,800
Ranges, Built-In.....	231,500	355,100
Unit Heaters and Duct Furnaces.....	133,800	160,600
Wall Heaters, Vented Recessed.....	389,000	448,900
Water Heaters.....	2,673,400	2,957,200
Oil Fired Central Heating Equipment*....	523,740	587,533
Total.....	8,280,540	9,114,733

* Eleven Month Figures.

Source: Gas Appliance Manufacturers Association.

STEEL KITCHEN CABINETS

<u>1959</u>	
Units Sold.....	1,350,000
1958	
Units Sold.....	2,000,000
1957	
Units Sold.....	2,490,000
1956	
Units Sold.....	3,000,000
1955	
Units Sold.....	4,046,000
1954	
Units Sold.....	3,372,000

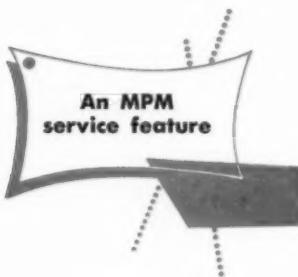
Source: Steel Kitchen Cabinet Manufacturers' Association and EM Week.

PLUMBING FIXTURES

Factory Shipments

Product	1954	1955	1956	1957	1958	1959
Lavatories						
Cast Iron.....	1,349,389	1,540,111	1,365,896	1,200,818	1,301,261	1,531,014
Steel.....	248,301	303,955	308,724	260,361	270,998	274,495
Total.....	1,590,690	1,844,066	1,674,620	1,461,179	1,582,189	1,805,439
Kitchen Sinks						
Cast Iron.....	1,008,873	1,060,086	921,358	778,052	817,649	875,609
Steel.....	1,169,121	1,363,971	1,318,076	1,149,461	1,200,000	986,550
Porcelain Enamel.....						420,060
Stainless.....						2,289,219
Total.....	2,177,994	2,424,057	2,239,434	1,927,513	2,017,649	2,289,219
Sink and Laundry Tray Combo						
Cast Iron.....						52,436
Steel.....						24,259
Total.....						76,695
Bathtubs						
Cast Iron.....	1,507,786	1,678,467	1,485,503	1,301,491	1,464,315	1,677,851
Steel.....	564,547	648,054	601,745	571,608	697,060	825,760
Total.....	2,072,333	2,326,521	2,087,248	1,873,099	2,161,375	2,503,611
Metal Shower Stalls.....						187,951
Total.....	5,841,017	6,594,644	6,001,302	5,261,791	5,761,913	6,855,915

Source: Facts For Industry.



STEEL SHIPPING BARRELS, DRUMS, AND PAILS

Factory Shipments

Product	1958	1959
Steel Shipping Barrels and Drums.....	31,490,568	33,594,312
Steel Pails.....	72,178,977	80,648,291
Total.....	103,669,545	114,242,603

Source: Facts For Industry.

Forecasts for Electrical and Gas Appliances as Published in January, 1960 MPM

NEMA MAJOR ELECTRICAL APPLIANCES

Total Industry Sales — Number of Units (Including Exports)

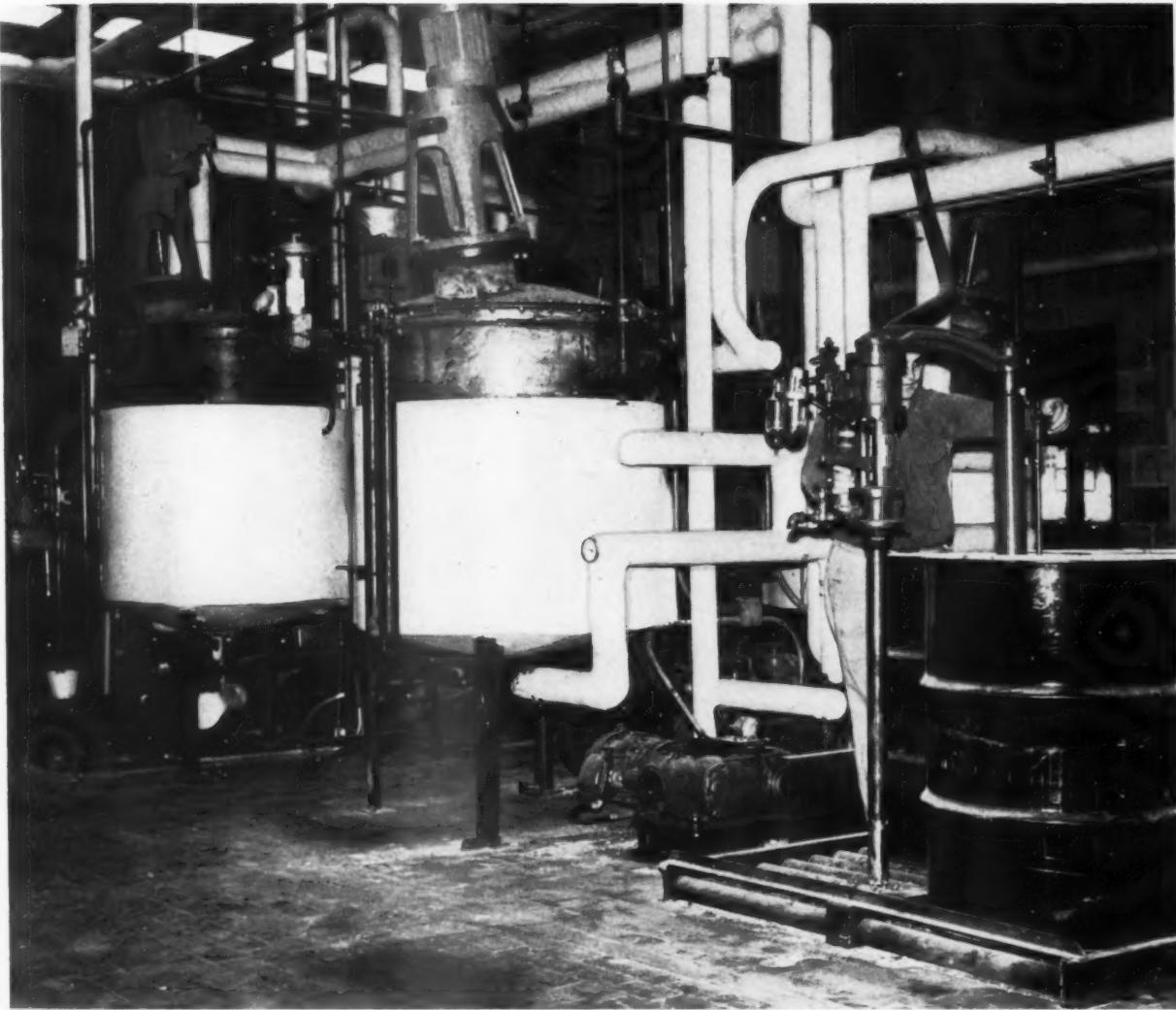
Major Electrical Appliances	Year 1958	Year 1959	% Change 59/58	Year 1960	% Change 60/59
Electric Household Refrigerators	3,116,700	3,750,000	+20.3	3,800,000	+1.3
Electric Farm and Home Freezers	1,100,900	1,200,000	+ 9.0	1,200,000	No Change
(includes chest and upright models)					
Electric Ranges (Over 2½ KW)					
Free-Standing Ranges	810,100	930,000	+14.8	950,000	+2.2
Built-In Ranges	544,400	750,000	+37.8	800,000	+6.7
Total Electric Ranges	1,354,500	1,680,000	+24.0	1,750,000	+4.2
Electric Storage Water Heaters	893,500	740,000	-10.1	750,000	+1.4
Electric Dishwashers	424,700	525,000	+23.6	575,000	+9.5
(Includes motor-driven types only. Excludes miniature or drainboard types.)					
Electric Food Waste Disposers (Plumbed-in units only)	616,500	785,000	+27.3	825,000	+5.1

Source: NEMA Statistical Department

ANTICIPATED 1960 INDUSTRY UNIT SALES

	SALES IN UNITS			Anticipated % Change as of June, 1959
	1960 (Consensus)	1959 (Estimated*)	Percent Change	
Domestic Gas Ranges				
Free Standing	1,713,900	1,723,700	- 0.6	+ 2.4
Built-Ins (oven-broiler units)	431,300	361,400	+19.3	+17.3
Total	2,145,200	2,085,100	+ 2.9	+ 4.9
Automatic Gas Water Heaters	3,012,500	3,016,000	- 0.1	+ 1.5
Gas Central Heating Equipment				
Warm-Air Furnaces	1,104,500	1,099,200	+ 0.5	+ 5.2
Boilers	142,400	137,900	+ 3.3	+ 5.5
Conversion Burners	141,900	153,200	- 7.4	- 4.5
Total	1,388,800	1,390,300	- 0.1	+ 4.4
Gas Vented Recessed Wall Heaters	452,600	459,300	- 1.5	+ 3.2
Gas Floor Furnaces	86,000	99,300	-13.4	- 8.4
Gas Direct Heating Equipment	1,482,800	1,465,900	+ 1.2	+ 7.6
Gas Incinerators	52,800	48,700	+ 8.4	+ 9.7
Gas Unit Heaters	141,100	136,800	+ 3.1	+ 5.2
Gas Duct Furnaces	25,500	24,100	+ 5.8	+ 9.2
Commercial Gas Ranges	33,700	33,200	+ 1.5	- 5.6

* Ten months actual, two months estimated.



EXCLUSIVE MPM PHOTO

Fig. 1—Plant for mixing the resin and the prepolymers required for "foaming."

THE WHIRLPOOL GAS REFRIGERATOR

Insulating refrigerators with urethane foam

AN MPM STAFF FEATURE

WHEN WHIRLPOOL DECIDED UPON a multi-million dollar investment in gas refrigeration research and engineering, the result was a number of innovations that had not been included in earlier gas refrigerator models. One of the major engineering steps was to design for the use of urethane foam (foamed-in-place) insulation throughout the refrigerator cabinet. All three of the 13-cubic foot models which comprise the RCA Whirlpool "No Frost" gas re-

frigerator-freezer line incorporate the foamed-in-place insulation, in both the freezer and food compartments.

There are three separate insulating lines, one for cabinet insulation, a second for doors (food compartment and freezer doors), and a third for insulating around the unit in the back of the cabinet.

The cabinet line was chosen for this exclusive MPM photo story, which will cover the principal steps on the operating line.

The mixing plant for mixing the resin and prepolymers (Fig. 1) requires a refrigeration unit (installed to the right

of the equipment in the photo, but not visible). This refrigeration system is used to cool the tanks so that the refrigerant which is mixed in the resin does not evaporate.

Jig design is important

The first step in the production line procedure is to place the liners in a jig (Fig. 2) which locates them in position and supports the inner surface of the liner, so that they cannot distort during the foaming operation. For the first step in the production line operation, the food cabinet liner and freezer liner are placed on a wooden form, supported by a

DOOR LINE IS AUTOMATIC

hydraulic elevator (**Fig. 3**). When the liners are in position, a prefabricated piece of pre-foamed insulation is placed between the freezer liner and food compartment liner. Notice that small pieces of pressure sensitive tape have been placed over all perforations in the liner.

This combined liner assembly is now raised by hydraulic elevator into the special jig assembly and securely locked in place. The liner is supported from above on an overhead monorail.

Parallel with the line just described is a floor-type conveyor which carries a jig for the cabinet exterior. An area the same shape as the refrigeration unit is built into the fixture to prevent the foam from entering this area. A rubber gasket of special design is placed around the opening of the refrigerator to prevent the foam from overflowing at the top during the foaming operations.

Parts are pre-heated

Parallel infra-red tunnels, incorporating rod-type heat sources, are used to pre-heat the metal parts before the foaming operation. This pre-heating of the metal results in better flow characteristics of the urethane foam insulation (**Fig. 4**).

In the "pouring" room, the cabinet exterior is rolled under an automatic metering machine (**Fig. 5**). The mixing head mixes the resin, the prepolymer, and the refrigerant and discharges the mixture through a single tube into the cabinet (the jigged liner is visible in the background of photo five, awaiting the cabinet for completing the assembly).

A meter at the top left of the instrument panel is a tachometer to give the operator a constant record of his speed on the mixing head. The various buttons along the instrument panel are control buttons which are used for various charges for different model refrigerators. There are two larger red buttons at the right, which serve as automatic shutoff switches in case any part of the equipment fails to operate properly.

The "foamed" cabinet is now moved into position under the pre-heated liner, and a second hydraulic lift is used to complete the assembly (**Fig. 6**). The liner and exterior cabinet are clamped securely into position at this point.

This complete assembly then passes into a curing oven, where the foam is permitted to cure at an elevated temperature for approximately ten minutes.

Photo (**Fig. 7**) shows the refrigerator cabinet with liner foamed in place *emerges to Page 93 →*

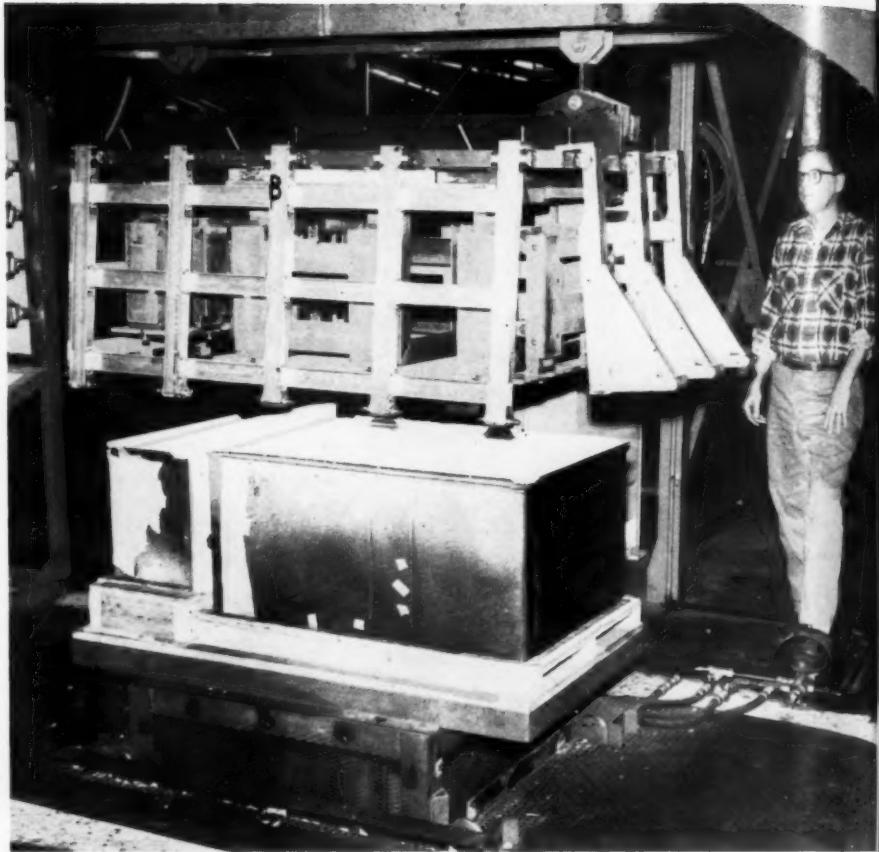




Fig. 2—(Top, opposite page) Food compartment and freezer liners in place for raising by hydraulic lift into special jig.

EXCLUSIVE MPM PHOTOS

Fig. 3—(Bottom, opposite page) Placing outer cabinet on jig prior to entering pre-heat tunnel.

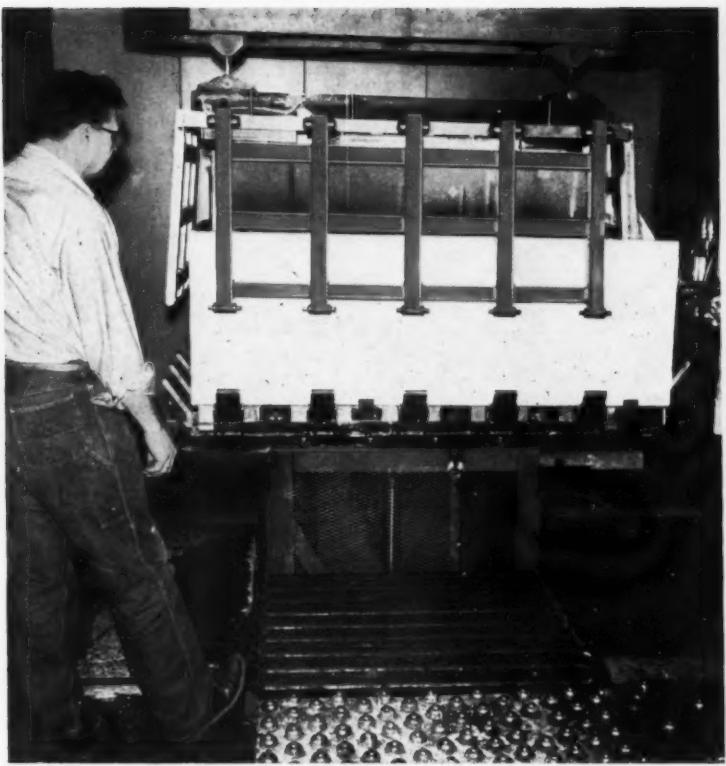


Fig. 4—(Above, left) Twin tunnels for pre-heating cabinet and liners prior to foaming.

Fig. 5—(Below, left) Control panel, mixing, and metering equipment at point of pouring urethane foam.

Fig. 6—(Above) Foot pedal controls hydraulic lift for "assembling" liner and foamed cabinet.

Fig. 7—(Below) Carl Morris, director of manufacturing research and manufacturing development. Much of the equipment used in the foaming operations was developed by Mr. Morris and his associates.



Avoncraft builds "package" p

AN MPM STAFF FEATURE

ON THE WEST BANK of the Mississippi River, just above the port of New Orleans and about one mile above the Huey P. Long bridge, lies Avondale Marine Ways. Avondale, for over twenty-one years, has been building a variety of ships and other marine equipment for the Navy, the Maritime Commission, and for private industry.

The company was organized in the early part of 1938 by Capt. H. G. Koch, a river boat pilot; James Viavant, who owned and operated a ship service company; and P. N. Ellis, who had an active oil transporting business. James Bull, formerly with the Lester F. Alexander Company and a specialist in steel fabrication, joined the original company shortly after its formation and is largely responsible for molding Avondale into a major industrial organization.

During World War II, the business was diversified so that, during the following years, the company built dredges and fishing vessels, did work in connection with levee building, locks, dams, and cast stainless steel propellers to replace those made of manganese bronze. As oil companies began to expand in Louisiana and offshore regions of the Gulf of Mexico, this brought new construction both in connection with boats and offshore rigs. More recent contracts include a deep water off-shore drilling rig, three 10,768-ton, 18-knot ships for the Delta Line, four destroyers (DE class), two guided missile destroyers (DDG class), and the U.S. Army Corps of Engineers' seagoing hopper dredge Markham.

A venture in light-gauge metal

In 1954, Avoncraft Division was formed as the fourth major division of Avondale Marine Ways. The new division was formed for the purpose of fabricating and porcelain enameling thin-gauge steel sheets for architectural and industrial purposes. Complete new facilities were built for Avoncraft, including an engineering and sales building, and a combined fabricating and porcelain enameling facility capable of turning out over 400,000 sq. ft. of finished porcelain enameled steel per month.

One of the principal "package" porcelain enameled buildings is Avoncraft's complete filling station for oil companies. Since most of the major and independent oil companies have turned to porcelain enameled steel for their new stations, this has been one of the major outlets for the production of the Avoncraft Division.

Fabrication at Avoncraft

The building that houses the Avoncraft fabricating and porcelain enameling department is 170 feet wide and 580 feet in length. A second floor, over the porcelain enameling section of the plant, houses engineering and plant offices. All planning and engineering for the buildings constructed by the company are handled in this section.

Sheet steel used by Avoncraft Division arrives at the plant by barge, rail, and truck. It is purchased in sheared sheet form, running from 12-gauge to 20-gauge in thickness, and the sheet sizes vary from 30 inches by 144 inches to 54 by 170 inches.

The company has its own standard gauge track, running into the entrance of the sheet metal department, and its own engine, which brings in carloads of steel and other materials. These materials may either come from the wharf which parallels the river, by rail, or by truck. Steel is shifted to company equipment and brought into the entrance of the plant, where a five-ton bridge crane is available for handling it through the full length of the storage area.

The first section of the sheet metal shop has a variety of miscellaneous equipment for doing all types of work, other than the fabrication for porcelain enameling. Most of it is joiner work or ventilation duct work and is largely for the shipbuilding industry and the Navy. Included are such products as galley sinks and other furniture for shipboard use, joiner doors and frames, ducts, transitions, and other components. A series of shears, capable of handling sheets up to 170 inches and in gauges up to 12 gauge, are placed in three bays the length of the building, so that the

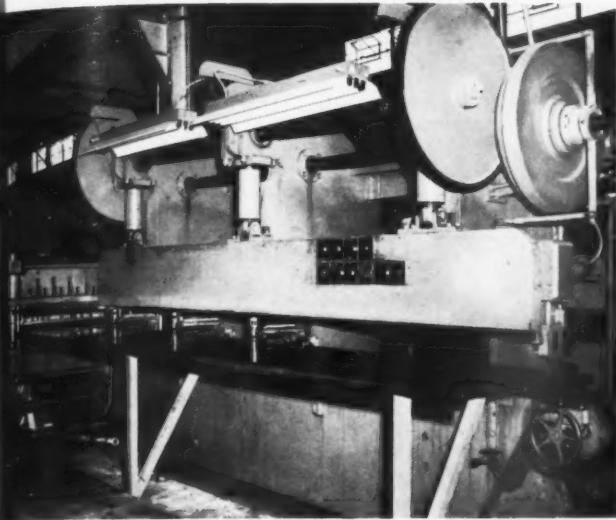
A typical example of company engineering and construction is represented by the Engineering and Research Building of Avondale's Main Plant at Avondale, La.

PHOTO COURTESY THORNHILL'S STUDIO



Large porcelain enameled buildings

FABRICATION



End and side shearing, together with punching along both ends and length of sheet, are performed here.



Forming steel sheets on a 14-foot press brake. This operation flanges the panels to a standard dimension for "jog lock" assembly.

PHOTOS COURTESY THORNHILL'S STUDIO

work can move progressively from shearing to punching and notching, and metal finishing, if required.

Standardization

In the development of the "package" buildings, standardization has been carried out as far as is feasible, so that in the fabricating department there are many standard panels that can be run in quantity. For example, on a big punch and press unit, large panels, 28 inches wide by 14 feet 1½ inches long, are sheared on sides and ends, and punched along ends and length.

Avoncraft manufactures both "skins" and load bearing panels with the latter walls and roof decking joined by butting, overlapping, or interlocking.

Welding

The majority of fabricated components are electric arc welded with some parts employing spot welding. Qualified sheet metal welders are specifically assigned to all work in this department.

Metal finishing

Finishing of those parts to be porcelain enameled involves hand grinding prior to the raw metal being sent to the porcelain enamel section.

The fabricated parts to be used for the "package" building units are loaded directly into pickle baskets for the cleaning and pickling operations. While the great majority of the sheet metal

used for this purpose is porcelain enameled, there are requirements for a small number of baked enameled sections of a special nature, which are used in connection with the porcelain enameled buildings.

Both spray equipment and drying equipment is lined up so that it can be used for both porcelain enamel and for paint, with provision made for a good "cleanup" between runs. While the same conveyor system and equipment are

used, the difference lies in the dryer. For porcelain enamel, an open flame heat source is employed, but when baked enamel is being run, this heat source is turned off and a battery of infra-red lamps (mounted on both sides of the dryer) are turned on to bake the organic finish. Two day shifts would normally operate on porcelain enameled ware, and then after a cleanup, a single shift takes over for baked enamel.

Porcelain enameling at Avoncraft →

EXCLUSIVE MPM PHOTO

Here is a typical grinding operation on door frames. In the background are two stacks of door frames that have been welded and ground. Frames on the floor are windows; those on truck in background are door frames. High speed electrical grinding equipment is used.



ALTHOUGH STANDARDIZATION of design has been carried out to a reasonable degree in the "package" buildings and other specialized building products produced of porcelain enameled steel by Avoncraft Division of Avondale Marine Ways, the porcelain enameling department must, nevertheless, be ready to enamel fabricated sheets and parts that vary greatly in size and weight and which, in some instances, vary greatly in end use requirements. For example, gauges may run from 20 to 12, and part sizes may run from a small component to a fabricated sheet 48 inches wide by 144 inches long.

While a great percentage of the square footage from the porcelain enameling department goes into "package" buildings and for other architectural uses, other specialty items vary from shower stalls to outdoor fire hose cabinets.

Service requirements vary from the normal acid and weather resistance characteristics needed for architectural applications to the high temperature resistance needed for some of the applications on big industrial boilers for power plants.

Other requirements are also widely varied, as might be expected in a porcelain enameling facility of this type.

"Man size" pickle room

The end of the fabricating line immediately adjoins the porcelain enameling department, so that all steel to be porcelain enameled can be loaded immediately into baskets or "cages" for handling through the cleaning and pickling tanks. The equipment consists of nine tanks for the solutions, and one tank dryer. Average tank size is 6 feet 8 inches deep by 6 feet wide by 18 feet in length. All tanks, with the exception of the acid tank, have a capacity of 4500 gallons. The acid tank has a capacity of 6000 gallons and is of acid-resisting brick construction. The acid cold rinse tank and the nickel tank are of #304 stainless steel. The remainder of the tanks are black iron.

The acid tank is heated with a lead coil in the bottom of the tank, using a small steam boiler as a heat source. All remaining tanks are heated, if necessary, by two gas-fired burners firing into two separate tubes. The tank dryer has four long gas-fired ribbon burners running the entire length of the tank.

The first two tanks in the line are for alkali cleaner and operate at four ounces per gallon at 212° F. Tank number three is a hot water rinse, operating at 180° F. The fourth tank is a cold water rinse at room temperature (both



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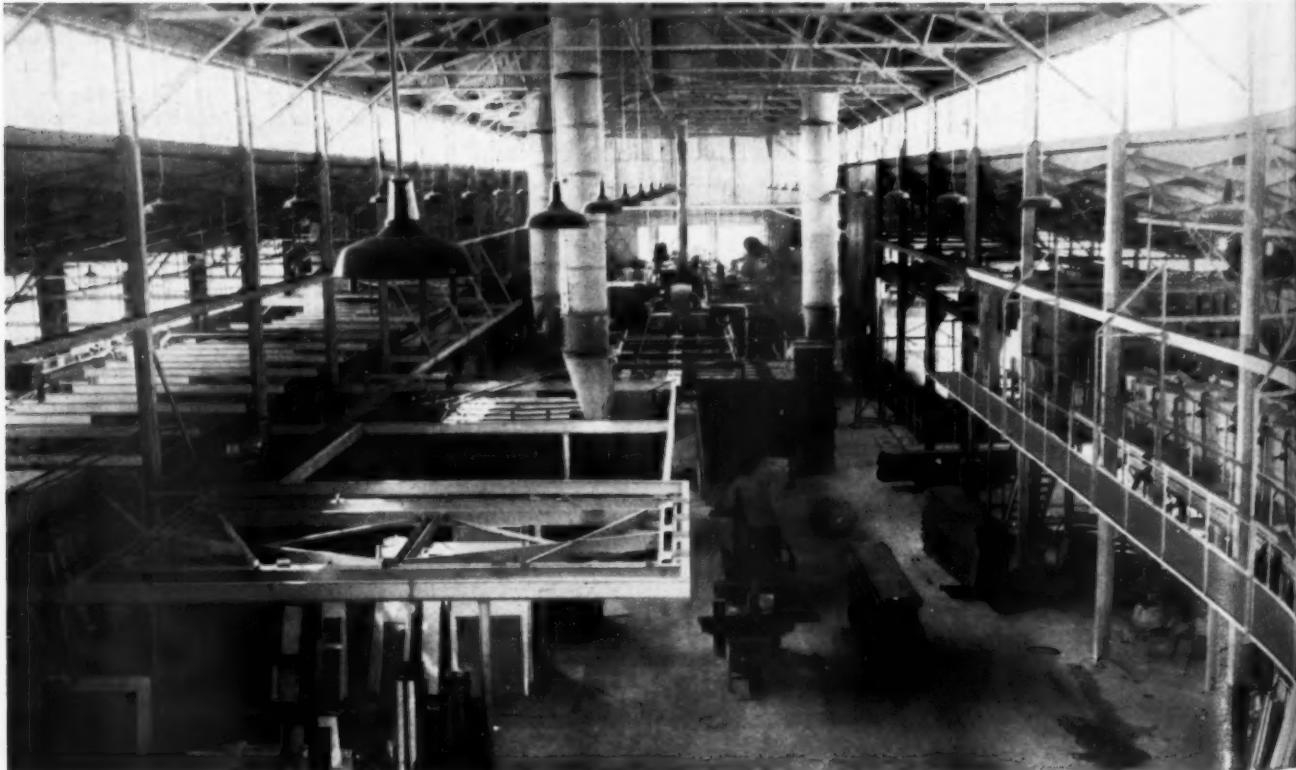
A. J. Legett, Jr., manager, Avoncraft Div., and Reggie Robichaux, one of Avoncraft's engineers, shown in the engineering department.

the hot rinse and the cold rinse tanks are designed for constant overflow). Tank number five is sulphuric acid operating at approximately 150° F. Tank number six is a reserve sulphuric acid tank at room temperature. Tank number seven is for acid rinse and operates at room temperature. Tank number eight is for nickel flash and nine is a neutralizer, both operating at 150° F. Tank number ten is the gas-fired dryer. Tank number eleven is a reserved space for future expansion.

Two different types of neutralizer are used. One is a proprietary compound; the other is a mixture of trisodium

View of the porcelain enameling plant from the engineering department.

PHOTO COURTESY THORNHILL'S STUDIO



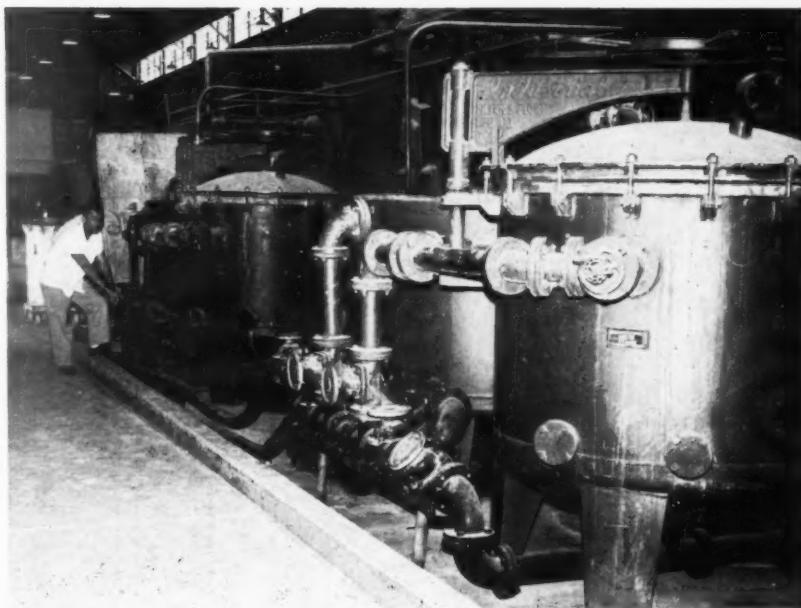
phosphate and borax. Tanks are recharged twice a week. Plant supervision reports that the plant has been set up to alternate the type of neutralizer used, for the purpose of saving wear and prolonging the life of neutralizer filter bags. Both neutralizer and nickel tanks are served by filter equipment.

The control system specifies that each morning, before the pickling is started, all tanks must be checked for temperature and concentration.

High density grinding media

The section of the enameling department set aside for milling and storage is immaculate and modern in every respect. Only five mills are required. Two mills take a 2000-lb. frit charge; a third mill is 600 lbs.; a fourth 200 lbs., and a fifth a 40-lb. charge. The mills are lined with high density porcelain brick

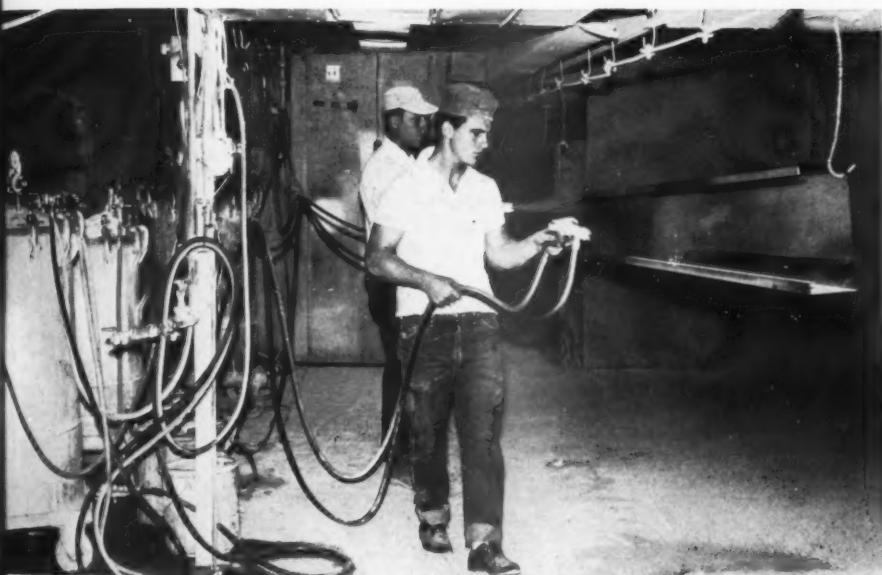
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(Above) — This filter equipment serves the neutralizer and nickel tanks in the pickle room.

EXCLUSIVE MPM PHOTOS

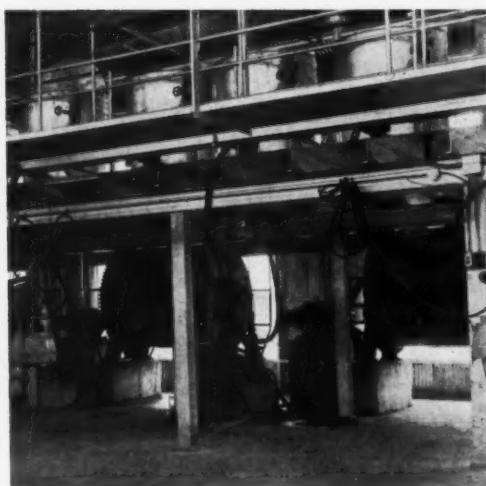
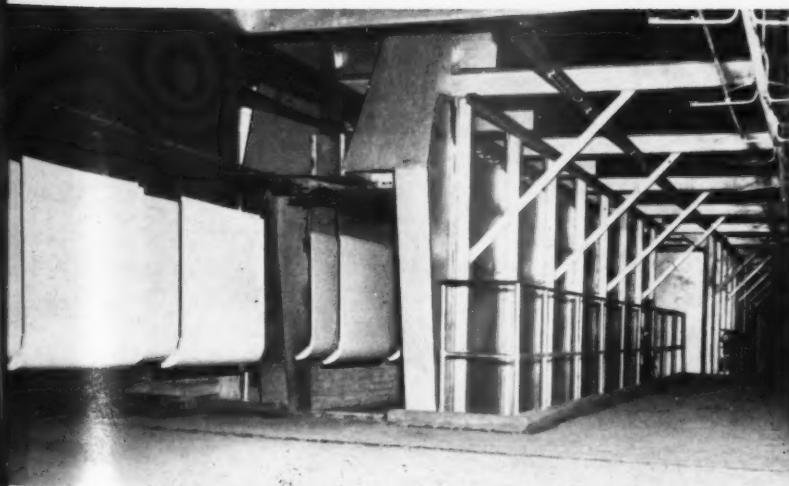
(Left) — In this side of the staggered spray booth, operators are applying ground coat to the reverse side of an architectural panel.



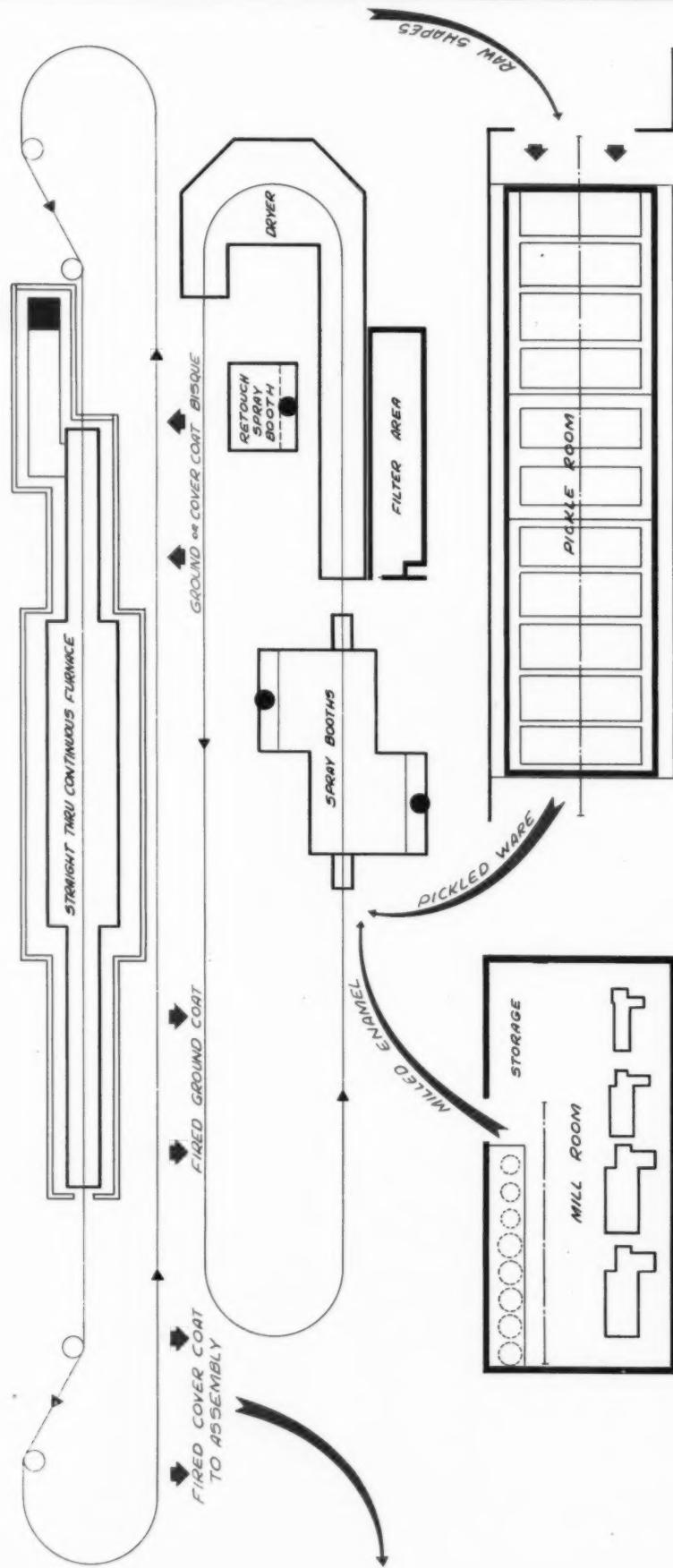
(Below, left) — Architectural panels in cover coat are leaving the 110-foot, straight through, continuous furnace after the final firing.

PHOTOS COURTESY THORNHILL'S STUDIO

(Below) — This view of a section of the immaculate mill room shows two 6000-lb. mills, plus overhead storage tanks for the enamel slip.



FLOW DIAGRAM OF PORCELAIN ENAMELING FACILITY AT AVONDALE



In the pickling department, equipment consists of nine tanks for solutions, and one tank dryer. The acid tank is of acid-resistant brick construction. Acid cold rinse tank and nickel tank are of #304 stainless steel. Remainder of the tanks are black iron. The eleventh tank is reserved for future use. Section set aside for milling and storage is immaculate and modern. Mills the construction department.

→ from Page 45

and high density grinding balls are used exclusively. The company reports that two of these mills have been in operation for five and a half years without maintenance.

The normal fineness of grinding on about 90 per cent of the enamel, excluding ground coat, is from one to two grams on a 200-mesh screen, using a 100-gram sample. Average grinding time varies from three to four and one-fourth hours.

Five stainless steel storage tanks for housing mill slip are located on a balcony immediately above the mills. Two centrifugal sieves, mounted on a monorail, serve for screening ground coat and cover coat enamels.

The pumping facilities consist of two pumps with internal magnetic separators.

One of the hundreds of porcelain enameled filling stations which have been produced and installed as "package units" by Avon-craft Division.



PHOTO COURTESY THORNHILL'S STUDIO

Two coat system

Ground coat is used on all parts, regardless of the end use of the product. The majority of the frits are of the titanium type. Antimony bearing frits are used for some specialized colors.

Cover coat standard for acid resistance calls for Class A in accordance with PEI specifications. Test reports show that all but two or three enamels for unusual colors can be applied to produce Class A acid resistance.

Application and firing

From the pickle room, the ware is moved over into position by the conveyorized spray line, where it is taken from the baskets and hung directly on the conveyor. Each panel is marked on the back or side for identification and moved into the spray booth where the back is sprayed first, and then the face. (Very little dipping is done in this plant, with both ground coat and cover coat being sprayed.)

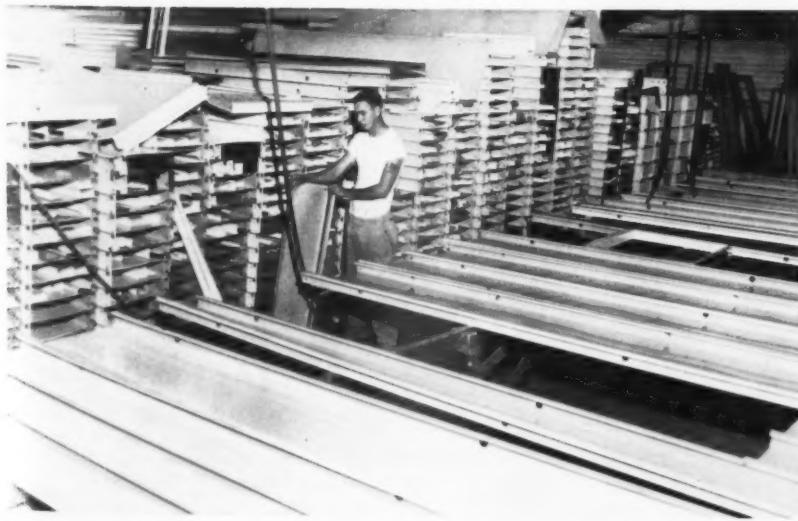
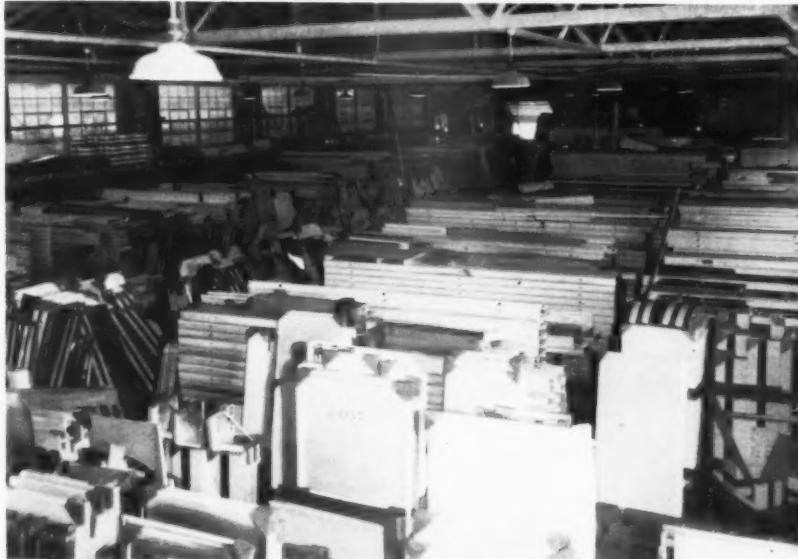
Ware moves from the "staggered" spray booth through an L-type gas-fired dryer heated to 300° F.

A small spray booth, located between the dryer and the furnace entrance, is used primarily for spraying small pieces and for touchup requirements.

As the ware leaves the dryer, the conveyor parallels the furnace chain for convenience in loading. The same spray booth is used for both ground coat and cover coat to be run on separate shifts.

For the building work, there is a percentage of panels which require second color for the lower or wainscote section.

to Page 93 →



(Upper Left) — In this warehouse section, over fifty complete porcelain enameled "packaged" filling stations are awaiting shipment. What appears to be an unorganized "jumble" of porcelain enameled sections is in reality a well-organized grouping of the essential components of complete stations, so that they can be loaded and shipped as complete units.

PHOTOS COURTESY THORNHILL'S STUDIO

(Left) — Here is the assembly area where standard panels are selected for assembling complete "package" units prior to shipment.

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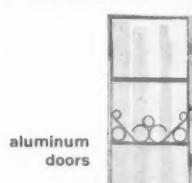
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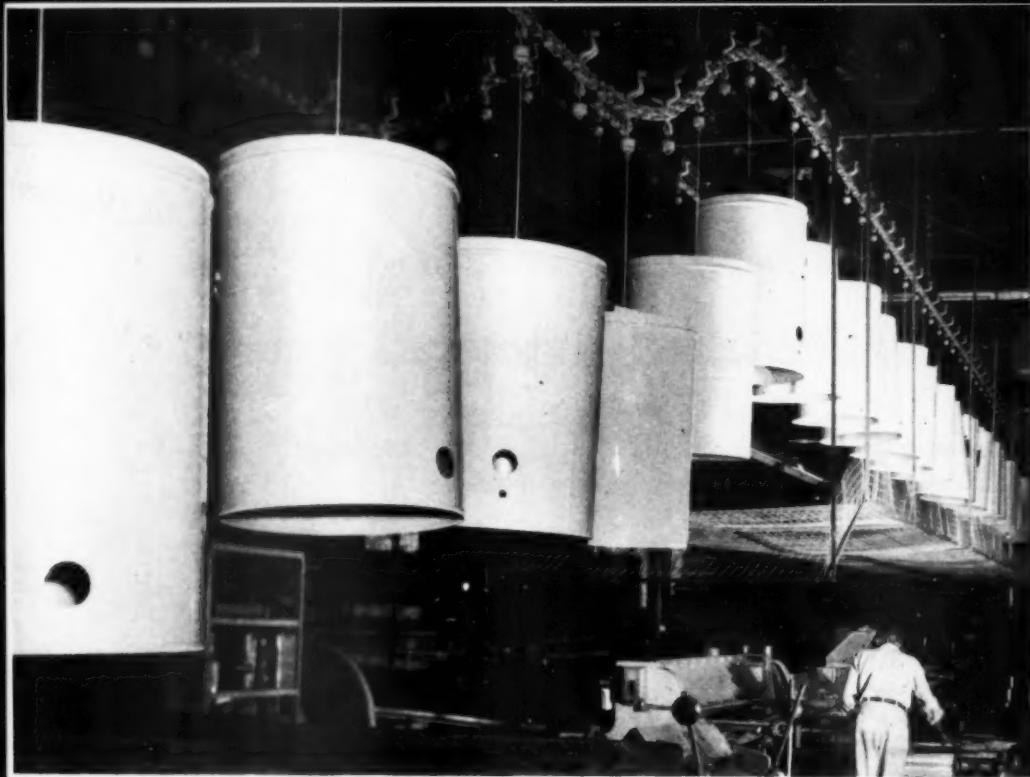
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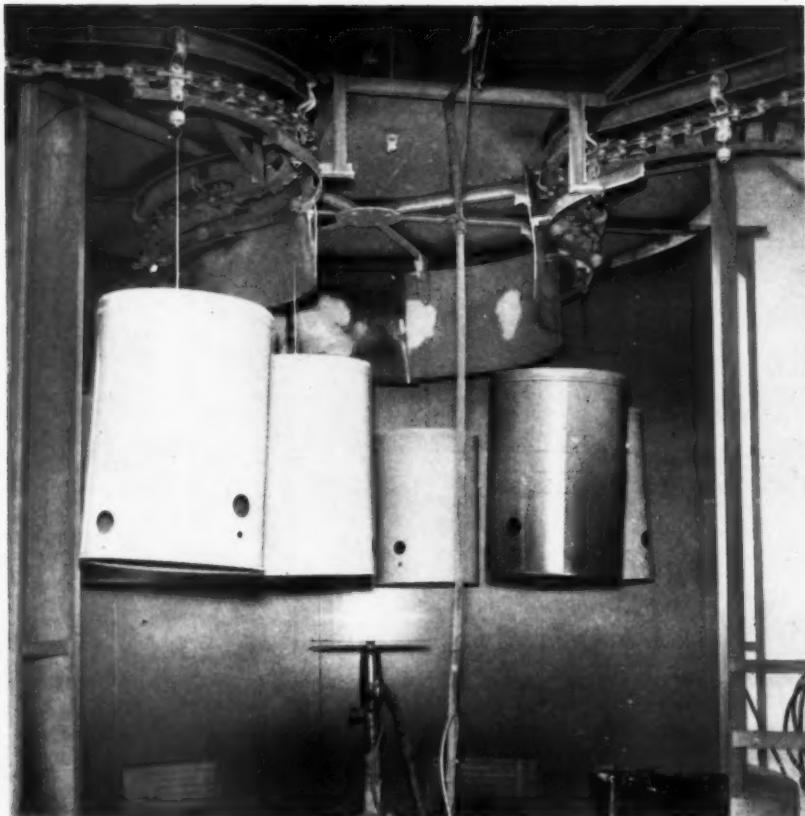


(Left) — Finished water heater jackets are moved on section of 800-foot conveyor system to assembly. Screen protects workers below.

PHOTOS COURTESY OAKITE PRODUCTS, INC.

(Lower left) — Jackets move through electrostatic reciprocating paint booth.

Finishing water heater jackets at Hotstream

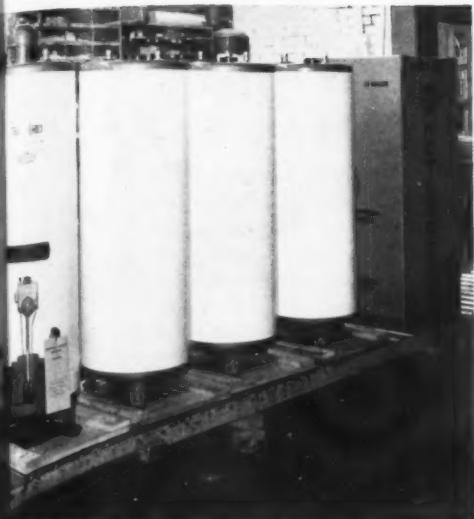


IN A MOVE TO MAINTAIN efficient production of high-quality water heaters, Hotstream Heater Co., Cleveland, recently installed a new paint finishing system.

Hotstream began production on a small scale nearly 45 years ago. Today the company is one of the country's leading producers of water heaters and associated appliances. Hotstream water heaters range in size from six to 120 gallons, and are made in gas, oil and electric models for use in homes, commercial and industrial buildings, house trailers, halls and churches. The company also manufactures water conditioners and barometric controls.

The new finishing facilities include 800 feet of conveyor, washing and phosphatizing equipment, an electrostatic paint booth, a baking oven, and modern safety equipment.

Washing and phosphatizing are carried out in a four-stage unit with three by six-foot openings. The solutions for the seven-minute washing cycle are heated by natural gas to 160° F. The heater jackets move from the washer to the electrostatic reciprocating head paint booth. The spray system has a 50-lb. head pressure. Hotstream uses a



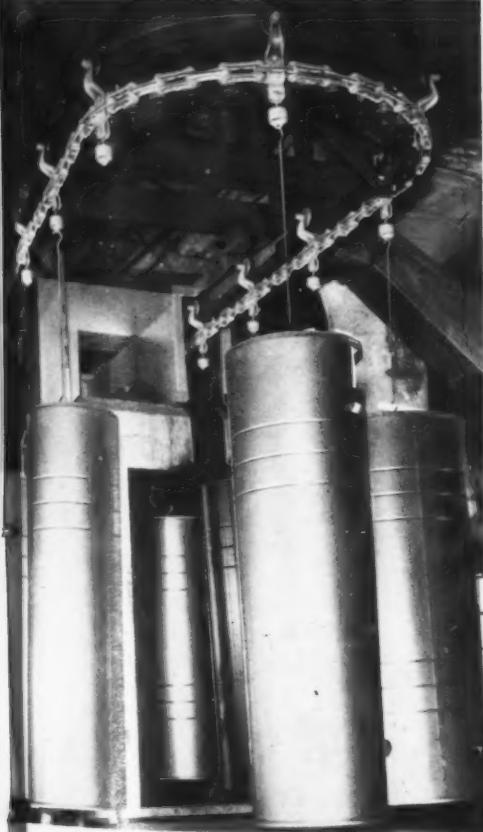
Finished Hotstream water heaters ready for packaging and shipping.

bake oven that is heated to 325° F. by electric quartz tubes.

The entire finishing cycle takes 20 minutes.

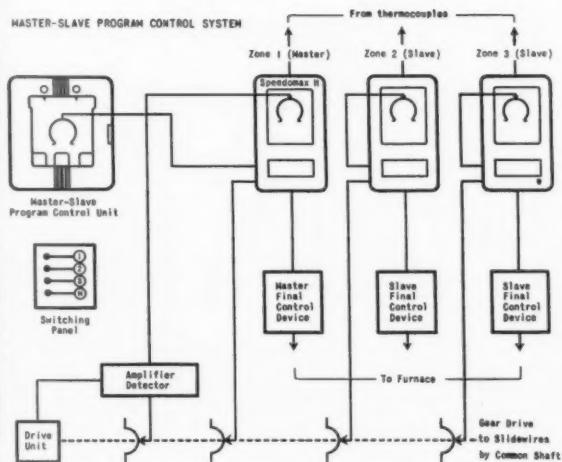
PHOTOS COURTESY OAKITE PRODUCTS, INC.

First step of the finishing cycle—jackets enter washing and phosphatizing machine. The seven-minute operation prepares surface of jackets for painting.



MPM APRIL • 1960

"Master-Slave" program control system



Main components of Master-Slave program control system, with zone 1 as Master, include: (1) Speedomax H controllers for zone control; (2) a Master-Slave program unit with appropriate interrupters, timers, switching panel, and control slidewires; (3) final control devices; and (4) primary elements.

DESIGNED FOR APPLICATIONS where temperature uniformity is of prime importance, Leeds & Northrup Co.'s "Master-Slave" program control system is being used successfully in the brazing of stainless steel honeycomb panels for supersonic aircraft and missiles. Here, fabricating requires close control over every product phase, and actual brazing temperatures must be held within plus or minus 10° F. during the brazing cycle.

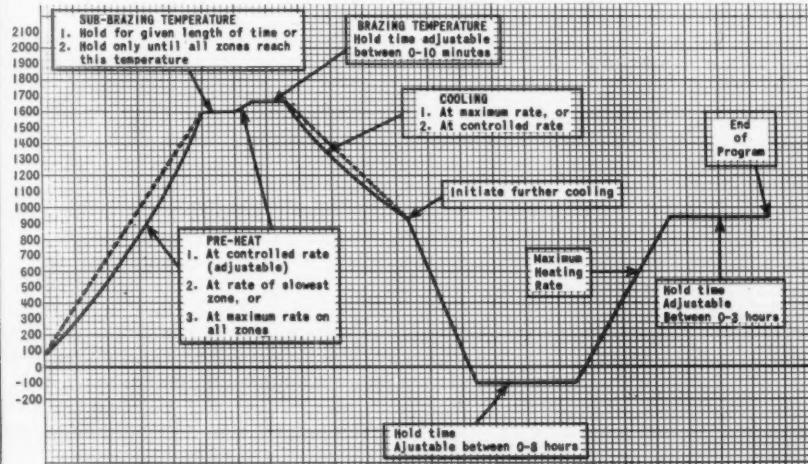
The system consists of three Speedomax H recorder-controllers with appropriate thermocouples and control devices for each of the three zones; the program control unit with its associated master drive unit for automatically and continuously adjusting control point setting for each zone; and a switching panel for selecting any one zone as the master.

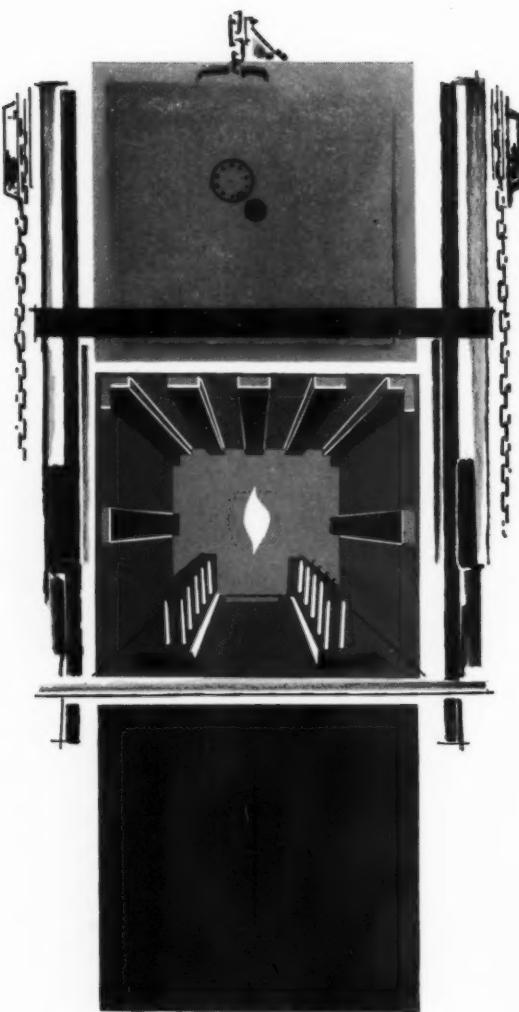
The system has the flexibility to take a product through various heating and

cooling rates and hold points with minimum temperature gradient. As many as 24 zones may be automatically controlled by one master programmer. The system is available with three-action P.A.T. control for gas-fired furnaces or with three-action C.A.T. control for continuous, stepless regulation of input to electric heaters or blankets.

A typical program consists of a pre-heat phase at a controlled rate, at the rate of the slowest zone, or at the maximum rate on all zones; a hold at the sub-brazing temperature for any given length of time or until all the zones reach that temperature; a hold at the brazing temperature (adjustable between 0 and 10 minutes); cooling at the maximum or at a controlled rate; a hold phase at sub-zero temperatures between 0 and 8 hours; another heating phase at a maximum rate; and the aging phase, adjustable between 0 and 3 hours.

Graph illustrates the flexibility of the Master-Slave program control system.





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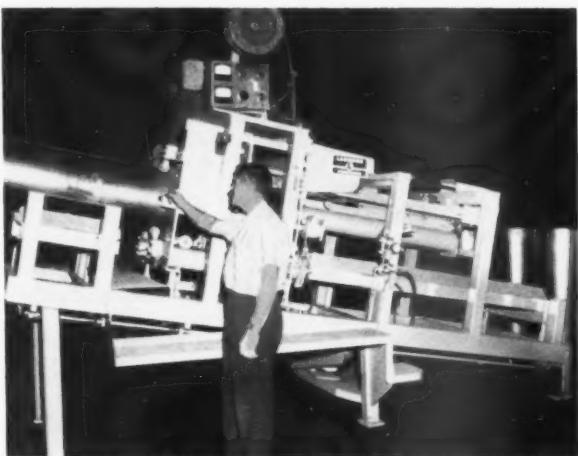
A NEWLY-DEVELOPED MACHINE welds water heater shells at adjustable speeds up to 200 inches of weld per minute, which is reported to be three times the rate of conventional methods.

The machine requires only one operator at point of feed. It starts its welding operation as soon as a tank is inserted, and it welds continuously as long as tanks are fed.

The unit is adjustable to all standard tank sizes from 12 to 20 inches in diameter. The hand operations of clamping, guiding of traversing welding head, unclamping, and unloading from the welder are eliminated.

Using the innershield welding process, with all welding materials contained within the electrode, the seam welder eliminates the need for flux retainers and recovery units, gas tanks, etc., required by other models. Water cooled backup behind welds permits continuous, high-speed operation without danger of overheating or creating material handling problems.

For complete information on the welder, write Special Projects Editor, Metal Products Manufacturing, York St. at Park Ave., Elmhurst, Ill.



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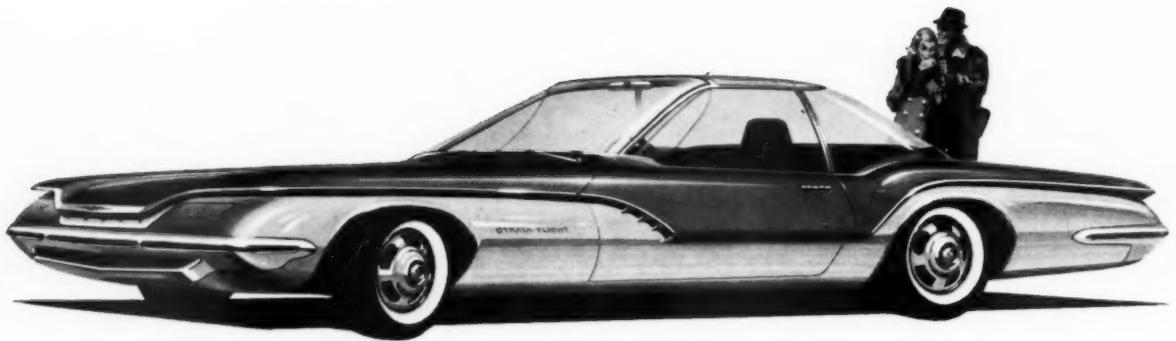


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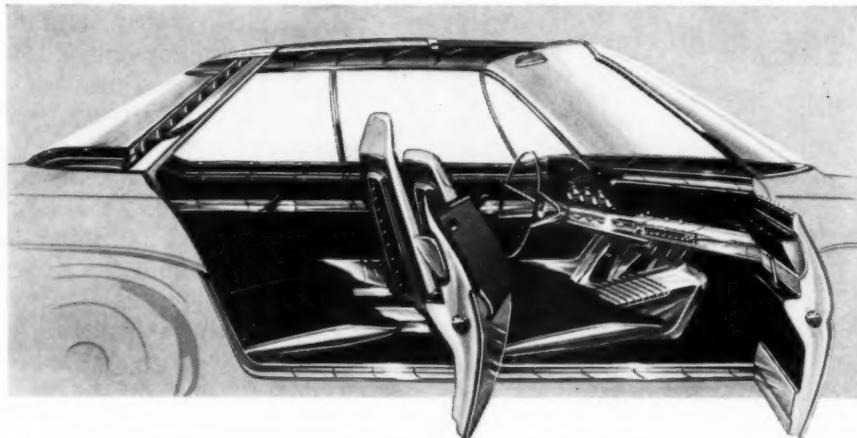
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**Snap Bushings
For Mounting Holes**

A line of Nylon snap bushings for use in mounting holes varying from $\frac{3}{8}$ inch to $1\frac{1}{2}$ inch in diameter has been introduced. The Nylon material provides complete insulation and mechanical protection for electrical wire and cable, tubing and hose, rope and cable, and the bushings can be used as bearings for moving parts. They are installed in the mounting holes under finger pressure, and are said to withstand at least a 35 pound push-back test.



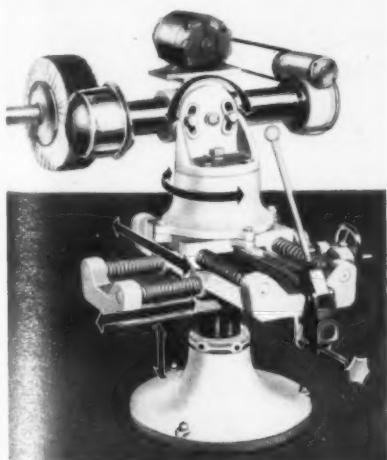
yet are easily removed by compressing the locking steps. The bushings are fully UL and CSA approved, and will withstand operating temperatures in excess of 150°C . (302°F .)

For further information, contact Dept. MPM, Heyman Mfg. Co., Kenilworth, N. J.

**Buffing, Grinding, Deburring
Machine**

A versatile unit which is said to handle practically any buffing or grinding job in the average plant is being produced. The machine, known as the Han-D-Matic, consists of a standard low cost basic pedestal and spindle unit with a wide selection of optional, interchangeable components which will accommodate practically any shape workpiece.

For further information, contact Dept. MPM, Murray-Way Corp., P. O. Box 180, Birmingham, Mich.

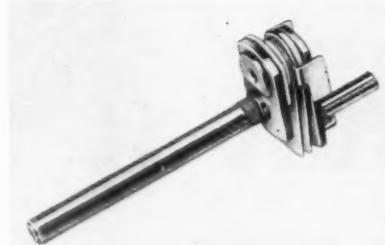
**De-Solder and Solder Device**

An induction de-solder and solder device for repair and salvage of printed wiring assemblies has been introduced. Preliminary tests conducted in an actual manufacturing operation show that the new device results in man-hour savings of up to 20 per cent over conventional methods. It is said to be the first of its type to be available commercially. For further information, contact Dept. MPM, General Electric Co., Schenectady 5, N.Y.

Probe-Type Thermostat

A heavy duty, probe-type thermostat designed for automatic household appliances such as deep fryers, skillets, waffle bakers, etc. has been introduced.

The Model B-600 is a non-bimetallic differ-

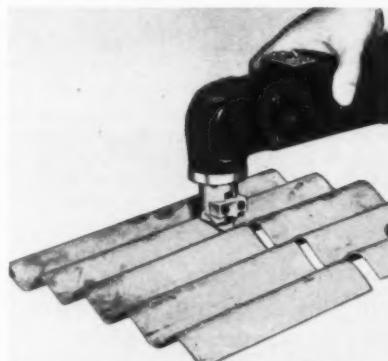


ential expansion-type thermostat, adjustable to a wide range of temperatures between 70°F . and 500°F . Once the thermostat is set at the desired temperature level, it is positive acting to keep the temperature at that given level without variation. To compensate for mechanical or thermal variations in the appliance at the time of installation, the Model B-600 has an adjustable set screw which permits trimming the calibration to closer limits.

For further information, contact Dept. MPM, American Thermostat Corp., South Cairo, N. Y.

Air and Electric Nibbler

A line of air and electric-powered nibblers, utilizing a special design and cutting action which is said to permit cutting of ferrous and non-ferrous metals without distortion, is being



manufactured. The unit is portable, and operates on a punch and die principle. Through a simple adjustment of the cutting head, the nibbler can cut through corrugated steel, and edges do not require finishing, such as deburring, grinding, or buffing.

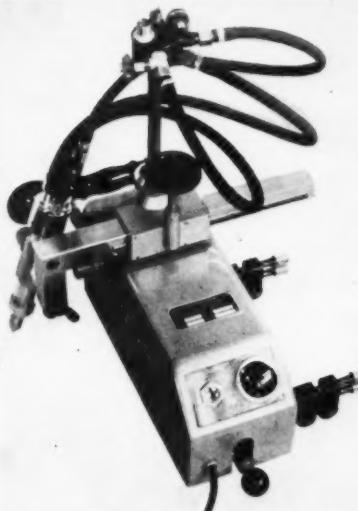
In areas where safety is of utmost importance, the air-powered nibbler proves suited for applications in chemical plants, oil refineries, and other areas where an electric tool would be hazardous.

Steel up to $\frac{1}{4}$ inch, and aluminum up to $\frac{3}{8}$ inch, may be cut, and various circles, squares, and odd-shaped holes can be cut.

For further information, contact Dept. MPM, Fenway Machine Co., 3107 N. Broad St., Philadelphia 32, Pa.

**Oxy-acetylene Cutting
Machine**

A portable, lightweight torch cutting machine which is said to be simple in design, easy to operate, and adjustable for straight or beveled cuts, has been introduced. It is used for cutting iron plates $\frac{1}{8}$ -inch to 4-inch thickness, making straight or beveled cuts to any desired angle. With controls conveniently located, the ma-



chine is readily and easily operated by unskilled operators, and is said to result in saving setup time and labor. The motor operates on ac or dc current, uses 110 or 220 volts, and consumes 50 watts per hour.

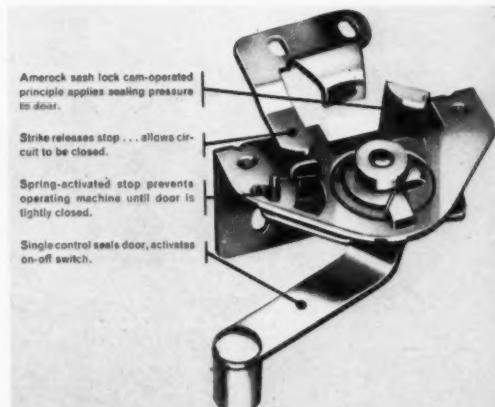
For further information, contact Milo Mfg. Co., 259 N. Broad St., Elizabeth, N. J.

**Combination Latch and
On-Off Switch**

A special latch, which serves also as an On-Off switch, has been designed for a leading appliance manufacturer. The device tightly closes the door of a dishwasher as it locks, effectively sealing the door to prevent water from escaping when the machine is in operation.

The dishwasher manufacturer also required the latch to serve as a master On-Off control so that the machine cannot be started while the door is open. This problem was solved by the development of a spring-actuated stop that prevents the latch from being closed until the door is completely shut. The stop is then released automatically so the latch can be closed, allowing the dishwasher to operate.

For further information on this, and other, applications, contact Dept. MPM, Amerock Corp., Rockford, Ill.



For air conditioning and refrigeration . . . **Copeland has what it takes!** most complete product line

From $\frac{1}{8}$ H.P. Copelaweld Space-Savers to rugged, compact 30 H.P. Copelametics, there's a Copeland motor-compressor for nearly any application. If your need is for condensing units, choose air, water or suction-cooled models . . . $\frac{1}{8}$ H.P. through 10 H.P. Copeland has what you want in truckload lots or single replacement products, thanks to . . .

continent-wide distribution

From ocean to ocean . . . wherever equipment is installed, there's a Copeland wholesaler nearby. He stocks *what you need* . . . he's ready to deliver *when you need it*. Each of 145 full-line wholesalers maintains inventories balanced to the needs of the area. Each one acts on a phone call in minutes because Copeland and your Copeland wholesaler believe in . . .

sales follow-through

Whether for a special application for missiles or a single-room air conditioner, Copeland and Copeland wholesalers offer the technical assistance that keeps customers satisfied. More than 30,000 refrigeration and air conditioning dealers and hundreds of equipment manufacturers buying Copeland products are testimony to the success of Copeland's all-inclusive manufacturing, distribution and follow-through program.

If you manufacture, sell or service refrigeration or air conditioning equipment, you'll find Copeland has what it takes to build and maintain dependability in products and profits.



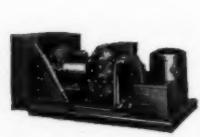
COPELAWELD Space Savers,
 $\frac{1}{8}$ and $\frac{1}{4}$ H.P. . . Copelaweld welded hermetics,
 $\frac{1}{2}$ through 4 H.P.



FAMOUS COPELAMETIC MOTOR-COMPRESSORS . . . air-cooled,
water-cooled, suction-cooled . . .
 $\frac{1}{4}$ through 10 H.P.



NEW, LARGER MOTOR-COMPRESSORS . . . four and six-cylinder
Copelametic accessible hermetics . . . $7\frac{1}{2}$ through 30 H.P.



COPELAMETIC AIR-COOLED CONDENSING UNITS . . . new compact
design . . . $\frac{1}{4}$ through 3 H.P. . . for trucks and other
applications.



BELT-DRIVEN CONDENSING UNITS . . . air-cooled and water-cooled . . . $\frac{1}{4}$ through $7\frac{1}{2}$ H.P.
Also combination and truck-type units.

THESE COPELAND WHOLESALERS KEEP MORE THAN \$3,000,000 IN COPELAND PRODUCTS at your fingertips

ALABAMA

1 Refrigeration Supplies Distributor
Birmingham — Phone: FA 4-6515
Hand Supply Company
Dothan — Phone: 4-3300
1 Harris Supply Company
Mobile 5 — Phone: 2-0541
Nolin-McKinis, Inc.
Montgomery 3 — Phone: 7323

ARIZONA

*** Pacific Metals Company**
Phoenix — Phone: Alpine 8-7821

ARKANSAS

Central Supply Company
Fort Smith — Phone: SUNset 3-8155
1 Refrigeration and Electric Supply Co.
Little Rock — Phone: FR 4-6373

CALIFORNIA

1 Pacific Metals Co., Ltd.
Los Angeles 22 — Phone: Raymond 3-5431
1 Pacific Metals Co., Ltd.
San Francisco 7 — Phone: Ullerdhill 3-5600
CAHADA
*** Refrigeration Supply Ltd.**
Calgary, Alberta — Phone: 9-3230
1 R. & E. Rejzn & Heat. Specialties Ltd.
Montreal — Phone: HU 95361
1 R. & E. Rejzn & Heat. Specialties Ltd.
Toronto, Ontario — Phone: 7-1176
R Refrigeration Supply Co., Ltd.
Vancouver, B. C. — Phone: Pacific 4188
1 R. & E. Rejzn & Heat. Specialties Ltd.
Winnipeg, Manitoba — Phone: WH 3-7576

COLORADO

1 McCombs Refrigeration Supply Co.
Denver — Phone: Cherry 4-6623
CONNECTICUT

*** Melchior, Armstrong, Dessau Co., Inc.**
Hartford — Phones: JACKson 2-7200 and JACKson 2-7204

WASHINGTON, D. C.

*** Melchior, Armstrong, Dessau Co.**
Phone: Executive 3-1218

FLORIDA

*** Graves-Broward Co. Inc.**
Ft. Lauderdale — Phone: 5-2744
Baker Bros. Inc.
Gainesville — Phone: 7-7414
1 Graves Refrigeration Company
Miami 30 — Phone: FR 2-7283

GARIBOLDI

Baker Bros. Inc.
Orlando — Phone: 5-4671

*** Graves Bros. Rejzn. Supplies**
St. Petersburg — Phone: 7-3460
Baker Bros. Inc.
Tallahassee — Phone: 2-1576

1 Graves Bros. Rejzn. Supplies, Inc.
Tampa 2 — Phone: 2-0755
Baker Rejzn. Supply Co., Inc.
West Palm Beach — Phone: 8171-23

GEORGIA
*** Graves Refrigeration, Inc.**
Albany — Phone: HEmlock 2-7021
1 Graves Refrigeration, Inc.
Atlanta 12 — Phone: JACKson 2-3755
Graves Refrigeration, Inc.
Augusta — Phone: 2-3562
Baker Bros., Inc.
Brunswick

Graves Refrigeration, Inc.
Columbus — Phone: 3-5702
Graves Bros. Co. of Macon
Macon — Phone: 25768-69
1 Baker Bros., Inc.

Savannah — Phone: 4-5164
Baker Bros., Inc.
Valdosta

ILLINOIS

Polar Supply Corp.
Bloomington — Phone: 4-9245
1 Chess Supply Company
Chicago 28 — Phone: PWillian 5-5125
Chess Supply Company
Chicago 18 — Phone: CORnelia 7-4836
1 Chess Supply Company
Chicago 22 — Phone: TAYlor 9-3121
1 Chess Supply Company
Chicago 21 — Phone: MIdway 3-2713
1 Refrigeration Supply Jobbers, Inc.
Chicago 39 — Phone: CAPitol 7-1058

*** Polar Supply Corporation**
Peoria — Phone: 4-9245
Polar Corp.
Quincy — Phone: BA 3-9750
Gustave A. Larson Company
Rockford — Phone: OXFord 3-0471-2
United States Electric Co.
Springfield — Phone: 2-7759
Rogers Refrigeration Supply Co.
Urban — Phone: EM 7-6488

INDIANA

1 Budweiser Refrigeration Supply Co., Inc.
Evansville — Phone: HA 2-3204
F. H. Langenkamp Company
Fort Wayne — Phone: MArrison 2241
*** Chase Supply Company**
Gary — Phone: TURNer 6-1911
H. W. Langenkamp Company
Indianapolis — Phone: MEdrose 6-4321
F. H. Langenkamp Company
South Bend 22 — Phone: CENTral 38222
Budwick Refrigeration Supply
Terre Haute — Phone: CR 3715

IDAHO

White Refrigeration Supply, Inc.
Denton — Phone: 5-2744
Dennis Supply Company
Des Moines — Phone: ATLantic 08579
Gustave A. Larson Co.
Dubuque — Phone: DUBuque 28826
Dennis Supply Company
Sioux City 3 — Phone: 5-7637

KANSAS

*** Sustainer Supply Company**
Wichita 2 — Phone: ABILENE 3-3421

KENTUCKY

*** Brock McVey Rejzn. Supply**
Lexington — Phone: 5-2514
F. S. W. H. Supply Company, Inc.
Louisville 2 — Phone: JU 79287

LOUISIANA

Atlas Refrigeration Supplies, Inc.
Baton Rouge — Phone: 4-3746
*** Thermal Supply Company**
Monroe — Phone: 4-3746

*** Acme Refrigeration Supplies, Inc.**
New Orleans 19 — Phone: CANal 7676
*** Thermal Supply, Inc.**
Shreveport

MARYLAND

*** Melchior, Armstrong, Dessau Co.**
Baltimore — Phone: SKRatoga 7-6358

MASSACHUSETTS

*** Melchior, Armstrong, Dessau Co.**
Wellesley 72

MICHIGAN

J. M. Ober, Inc.
Detroit 3 — Phone: TOWnsend 9-6800
1 Utsey Distributing Company
Flint 3 — Phone: CE 4-1603

*** Midwest Refrigeration Supply Co.**
Grand Rapids 4 — Phone: 4-1517

MINNESOTA

*** Refrigeration Wholesalers, Inc.**
Burlift 2 — Phone: RAnghorn 7-5047

*** Refrigeration & Indus. Supply Co., Inc.**
Minneapolis 2 — Phone: FEderal 2-8577

*** Refrigeration Supply Co., Inc.**
St. Paul 2 — Phones: CApitol 2-3673 and CApitol 2-3423

MISSISSIPPI

1 Plumbing Wholesale Company
Jackson — Phone: 27623
Motor Supply Company, Inc.
Meridian — Phone: 26135

MISSOURI

1 Superior Supply Company
Kansas City 8 — Phone: Baltimore 13334

1 Authorized Refrigeration Parts Co.
St. Louis 10 — Phone: FRanklin 1-2773

Hoffman Supply Company
Springfield 2 — Phone: 2-6711

MONTANA

*** Temperature Supply Company**
Billings — Phone: 2017-172

*** Temperature Supply Company**
Great Falls — Phone: GL 26016

NEBRASKA

Dennis Supply Company
Omaha 2 — Phone: JACKson 2277

NEW JERSEY

*** Melchior, Armstrong, Dessau Co.**
Brooklyn 7 — Phone: MIdway 7-2600
Melchior, Armstrong, Dessau Co.
Buffalo 4 — Phone: MADison 0273-2

Melchior, Armstrong, Dessau Co.
New York 16 — Phone: MIdway Hill 4-6080

Melchior, Armstrong, Dessau Co.
Syracuse 2 — Phone: GRAnite 3-0191

NEW MEXICO

M. H. Alvarado Refrigeration Supply Co.
Albuquerque — Phone: Chaplet 7-4191

NEW YORK

*** Melchior, Armstrong, Dessau Co.**
Brooklyn 7 — Phone: EDison 24231

Melchior, Armstrong, Dessau Co.
Galveston — Phone: 5-5326

Thermal Supply Company
Harlingen — Phone: GARfield 3-5810

Thermal Supply Company
Houston — Phone: CA 6-0341

Tesco, Inc.
Lubbock — Phone: FE 2-9456

Tesco, Inc.
Odessa — Phone: FE 2-9456

Thermal Supply Company
San Antonio — Phone: CApitol 5-7641

Climate Supply Co., Inc.
Tyler — Phone: LY 3-6481

Tesco, Inc.
Waco — Phone: 3-2423-3

NEW YORK

*** Pacific Metals Company, Ltd.**
Salt Lake City 4 — Phone: CHArles 2-3461

WIRGINIA

*** Noland Company, Inc.**
Newport News — Phone: 7-1241

Noland Company, Inc.
Norfolk — Phone: MADison 2-6541

1 Refrigeration Supply Company
Roanoke — Phone: 3-2742

Noland Company, Inc.
Roanoke — Phone: 45561

WASHINGTON

1 Thermal Supply Company, Inc.
Seattle 1 — Phone: ATwater 2-6100

*** Thermal Supply Co., Inc.**
Yakima — Phone: GEnesee 2-9155

*** Thermal Supply Co., Inc.**
Spokane — Phone: FA 6-0412

WEST VIRGINIA

*** Miner Refrigeration Supply Co., Inc.**
Charleston 2 — Phone: 3-8163 & 3-1433

WISCONSIN

Gustave A. Larson Company
Eau Claire — Phone: TE 2-5405

Gustave A. Larson Company
Green Bay — Phone: HEmlock 5-7433

Gustave A. Larson Company
Kenosha — Phone: OLYMPIC 2-1873

Gustave A. Larson Company
Milwaukee 3 — Phone: Gibson 77145*

Pacific Pacific Company
Eugene — Phone: DIamond 4-6203

*** Peerless Pacific Company**
Portland 12 — Phone: Atlantic 8-5111

PENNSYLVANIA

*** Melchior, Armstrong, Dessau Company**
Philadelphia — Phone: LOUis 7-1516

W.W. Williams Company, Inc.
Pittsburgh 33 — Phone: CEdar 1-8800

SOUTH CAROLINA

*** Baker Bros., Inc.**
Charleston

MISSOURI

*** Superior Supply Company**
Columbia — Phone: 3-7551

*** Henry V. Dick & Co., Inc.**
Grand Island — Phone: CE 5-0433

*** Noland Company, Inc.**
Spartanburg — Phone: 3-2701

TENNESSEE

*** Noland Company, Inc.**
Chattanooga — Phone: AMherst 7-1284

*** Knoxville Refrigeration Supply Company**
Knoxville 17 — Phone: 4-3331

*** United Refrigeration Supply Company**
Memphis 3 — Phone: JACKson 5-3788

J. B. Thomas Company, Inc.
Nashville 3 — Phone: 4-2691

TEXAS

*** Jones-Nerby Supply Company**
Dallas — Phone: DIAmond 2-9292

*** Thermal Supply Company**
Austin — Phone: GLENwood 6-9143

*** Thermal Supply Company**
Beaumont — Phone: TE 2-3128

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on Copeland products that
fit your needs.**



Copeland
REFRIGERATION CORPORATION, Sidney, Ohio

Manufacturers of performance-proved motor-compressors and condensing units
for air conditioning and refrigeration

COPALAMETIC WATER-COOLED
CONDENSING UNITS . . . new,
compact design . . . 1/4 through
7½ H.P. Also combination air
and water-cooled units.

Ferro ONE-COAT Porcelain enamels

for "special" and
non-premium
steels



SPECIAL STEEL "A" (Armco Steel)



SPECIAL STEEL "C" (Inland Tinamel)



SPECIAL STEEL "B" (Bethlehem Steel)



REGULAR COLD-ROLLED, RIMMED STEEL



SPECIAL STEEL "D" (U. S. Steel)

What is Best for your products?

See and compare the fine one-coat porcelain enamel finishes developed by Ferro over the past ten years. They may be used with a variety of steels, as shown above, each of which has been thoroughly tested if not already in commercial production. While processing techniques may differ, any one of these steels can be used to obtain a high-quality porcelain enamel finish with one-coat at substantial savings.

Ferro's most recent process, widely publi-

cized in recent months, makes possible the use of non-premium steels for these superior one-coat finishes. This, of course, means lower material costs and wider sources of steel supply.

Whichever base metal you may select, you will find Ferro's experience and production-proven products extremely valuable in adapting one-coat porcelain enamels to your products, your production facilities. When can we talk to you about it?



FERRO CORPORATION

4150 East 56th Street • Cleveland 5, Ohio
Nashville 11, Tenn. • Los Angeles 39, Calif.

Industry News**Kawneer Net Income Up 92 Per Cent**

Net income for Kawneer Co. in 1959 rose 92 per cent to \$1,881,000, on a sales increase of 40 per cent. This amounts to \$2.01 per share compared with \$1.10 per share for 1958 when earnings amounted to \$979,000.

Suggestions Earn Employees \$256,089

A near-record total of \$256,089 was paid last year for approximately 9,000 suggestions submitted by employees throughout the Westinghouse Electric Corp. The six-figure total was the third highest in the 50-year history of the company's suggestion system.

UAC Expands Sales Program

Utility Appliance Corp. is embarking on a sales expansion program for its Gaffers & Sattler product division. Aside from promotional campaigns to introduce several new products, the company is also entering new marketing areas for their appliances.

Among the new products to receive special advertising, public relations, and sales promotion are built-in ovens and cooking table tops, evaporative air coolers, a germicidal filter, a duct heater line, and air conditioning equipment.

Sunbeam Acquires Oster Mfg. Co.

John Oster Mfg. Co., Milwaukee, has been acquired by the Sunbeam Corp., Chicago. Oster manufactures barber and beauty supply equipment, health appliances, electrical housewares, and aviation and missile precision instruments.

Reports Record Earnings; Sales Functions Realigned

Whirlpool Corp. has announced that 1959 dollar sales volume and earnings were the highest in the company's history.

Net sales of approximately \$430,496,000 represented a 6.4-per cent increase over 1958, which was the best previous year, and earnings were estimated at \$20,481,000, more than double the 1958 figure.

Factory shipments of Whirlpool ranges reached a new record level in

January. Range shipments from the company's Hamilton, Ohio plant exceeded the previous high set in July, 1956 by more than 15 per cent, and January, 1959 by 105 per cent.

Whirlpool also announced a realignment of laundry sales functions. This re-alignment, according to Harry Kane, general manager of the laundry division, is intended to produce the specialization that the present laundry market requires. The new responsibility for sales shapes up as follows: C. Edward Reiner has been appointed sales manager for automatic and wringer washers; William W. Howard, who joined Whirlpool in 1954 after experience in both retail and wholesale fields, becomes sales manager of gas and electric dryers; and John W. Benson, assistant national advertising manager since early 1959, is the new sales manager of gas and electric combination washer-dryers.

Youngstown Offers Sales Training

A dealer sales training program is being offered by Youngstown Kitchens. One session was held March 28-30, and another is scheduled for April 25-27 at Warren, Ohio.

Curriculum for the program covers many phases of selling, advertising, and kitchen planning and decorating.

Preway Names New Officers

Preway Inc., manufacturer of built-in kitchen appliances, has announced five executive appointments. Gerald I. Boyce was named to the position of assistant to the president; Harry G. Morse was appointed contract sales manager; Robert T. Polaer was named sales promotion manager; Louis P. Schanock was appointed co-ordinator of sales research; and Willard Johnson is director of utility sales.

GE Offers Replacement Plan For Educational TV Sets

The General Electric television receiver department is offering school authorities an annual replacement plan for educational TV sets. The company proposes to supply schools with standard receivers at minimum cost and avail the school of the opportunity to update receivers each 12 to 18 months on a replacement basis.

A special financing plan by the General Electric Credit Corp. is available for educational institutions not in a position to make a large capital outlay. The plan would permit use of 100 educational television receivers for a cost less than \$1 per set per week to the supporting school districts or institutions.

GE analysts have estimated that there will be a student population in 1965 of

Kelvinator Appliances Offered In Grocery Promotion

Some \$50,000 in Kelvinator major appliances will be given away during the fourth annual "Food Store Spectacular," co-sponsored by the National Retail Grocers Association and the *Saturday Evening Post*.

The promotion, which will run from October 20 to 29, will be kicked off at the consumer level with a multi-page advertising section of the October 22 issue of the *Post*. It will be supported

by widespread local advertising.

Kelvinator and NARGUS will lead the *Post* advertising section with a double-page spread showing the ten appliances from which the top contest winner will choose her array of prizes. The appliance prizes will include refrigerator-freezers, home freezers, dishwashers, electric ranges, water heaters, room air conditioners, disposers, dehumidifiers, automatic washers, and clothes dryers.

Shown looking over the plans for the 4th annual Food Store Spectacular are (left to right) Jay S. Riddle, grocery products marketing manager of Saturday Evening Post; William E. Saylors, director of advertising and sales promotion, Kelvinator; Robert B. Shellenberg, manager of appliance and hard goods marketing for the Post; and Homer L. Travis, vice president in charge of sales, Kelvinator.



52.5 million and teacher shortage in that year of a quarter million. Based on the claimed optimum of 20 pupils to each TV set, the company estimates the potential ETV set market in 1965 will reach 2,750,000.

Record Sales for General Controls

General Controls Co. reports increases in both sales and earnings during the fiscal year which ended Dec. 31, 1959. Net sales rose to \$40,013,633, highest in the firm's history, compared with \$33,774,321 registered in 1958.

Net earnings for 1959 amounted to \$1,612,975, or \$1.65 a share on the 869,884 shares of common stock outstanding on the last day of 1959. This compared with \$1,438,933, or \$1.49 a share based on 866,348 shares outstanding for 1958.

Air Conditioning Film on TV

"Weather or Not," a motion picture film for television use, started its rounds of television stations in the United States and foreign countries in mid-February. The film portrays the benefits of air conditioning in the home, office, store, hotel, factory, and elsewhere, as well as publicizing the unitary air conditioning certification program and the

Program Announced for Appliance Technical Conference

A tentative program has been announced for the 11th Annual Appliance Technical Conference scheduled for May 16 and 17 at the Mansfield-Leland Hotel, Mansfield, Ohio.

The keynote speaker will be R. E. Brooker, president of Whirlpool Corp., who will discuss the role engineers play in top management policy thinking. Another featured speaker will be B. A. Chapman, executive vice president of the Kelvinator Division of American Motors Corp., whose subject will be, "Annual model changes vs. continual incorporation of significant technological advances."

The balance of the meeting will consist of plant tours and the presentation of technical papers. The tentative program follows:

Session 1 — Technical papers. Session chairman: M. A. Fuller, research engineer, Whirlpool Corp.

Session 2 — Technical papers, Session chairman: Warren Kindt, engineering manager, component design,

range department, General Electric Co.

Session 3 — Plant tours. Session chairman: E. O. Morton, manager, laundry engineering department, Westinghouse Electric Corp.

Session 4 — Luncheon. Session chairman: W. R. Milby, director consumer services, Detroit Edison Co. Address by B. A. Chapman.

Session 5 — Technical papers. Session chairman: Dana Chase, MPM editor and publisher.

Among the topics that will be covered in the technical sessions are standardization of small motors, calibration and quality control testing of thermostats, positive quality control, control system design for refrigerators, ultrasonics in fabric washing, a hard coating process for aluminum, an automatic surface unit control for ranges, and several other subjects.

R. A. Risser of the Ohio Brass Co., Mansfield, Ohio, should be contacted for registration details.

seal of certification sponsored by the Air-Conditioning and Refrigeration Institute.

Produced as one issue of the Peabody

Award Winning television series sponsored by the National Association Of Manufacturers, the 13.5-minute film will be shown on some 270 television stations in the United States and by 42 overseas stations.

Electronic Cleaners Announced

A new line of electronic air cleaners for installation in homes and smaller industrial buildings was announced recently by the Electro-Air Cleaner Co.

According to the company, the new units were made possible by reducing ionizing-collecting cell plate spacing to 5/16 inch, and the application of other refinements in the cell and power pack design.

ACS Offers Outstanding Program For Porcelain Enamelters

The Enamel Div. of the American Ceramic Society holds its annual meeting at the Bellevue-Stratford Hotel in Philadelphia, Pa., April 25-27.

The program includes a total of 21 papers which concern the varied interests of the division. Three symposia are currently planned for this meeting and should be of interest to the members of the porcelain enamel industry. The first symposium, "Reaction Mechanisms," concerns the reactions of hydrogen and steel. The second, "Porcelain Enamel Adherence," is made up of four papers discussing the process of adherence of

porcelain enamel to steel from the standpoint of the etching of the metal, the use of a nickel dip or flash, bonding mechanism, and the gases associated with porcelain enameling.

The third symposium, "High Temperature Ceramic Coatings," covers the specialized system of coatings for special metals and alloys such as tungsten, molybdenum and alloys. One paper of the symposium concerns the flame-spraying of ceramic materials to metal.

Other papers of particular interest on this program concern one-coat enameling, low temperature enamels, the surface durability of porcelain enamels, dielectric behavior at elevated temperature and stress behavior of porcelain enameled metals. Two papers will be presented on the use of the X-ray spectrophotograph with porcelain enamel frits.

George H. Spencer-Strong of the Pemco Corp. will become president of the Society at the meeting. Dr. Spencer-Strong is vice president of Pemco, a manufacturer of porcelain enamels, ceramic glazes and oxides, and glass colors.

As an active member of the Society since he joined in 1926, Dr. Spencer-Strong was chairman of the Enamel Division in 1938-39, counselor in 1939-40, and trustee from 1949 to 1952. He is now counselor of the Baltimore-Washington Section, having held all of the offices of that group in the 1930's.

Robertshaw Opens Mexico Plant

A new plant in Mexico City, Mexico, for the assembly and manufacture of automatic precision control devices for the gas appliance industry has recently been opened by Robertshaw-Fulton Mexicana, A.A. de C.V.

The Mexican company is a subsidiary of Robertshaw-Fulton Controls Co., which has headquarters in Richmond, Va. Russell F. Garner has been named general manager of the new plant. He had been a production engineer with Robertshaw.

Lennox Industries Introduces New Heating-Cooling Unit

Lennox Industries Inc. has announced a new heating-cooling package for apartments and small commercial applications.

All the equipment, including gas furnace, cooling coil, and air-cooled condensing unit, fits within a 36-inch by 36-inch closet. The air handling portion of the condensing unit extends through an outside wall and is flush with the outer wall surface. The part of the con-

densing unit that remains in the closet becomes the base for the furnace. The cooling coil is mounted on top of the furnace. Completely assembled, the unit requires only 89 inches of headroom.

The Lennox unit provides a nominal two tons of cooling and 51,000 Btu/hr input of heating (all gases). The furnace has a continuous welded heat exchanger, aluminized steel burners, 100 per cent safety shut off, built-in draft diverter, 24-volt control system, a Lennox "hammock" type throwaway air filter, and a quiet direct-drive blower.

Three-Way Merger

It has been reported that all stockholders have agreed to a three-way merger between Silex Corp., The Proctor Electric Co., and Proctor and Schwartz.

Controls Co. of America Forms New Switch Division

Controls Co. of America has formed a new division identified as the Control Switch Div. The new division was created by combining the operations of the company's former subsidiary, Hetherington, Inc., with those of Electrosnap Corp., which was merged into Controls Co. at the year-end.

The new division will have a product line including such items as switch lights, push-button switches, miniature toggle switches, precision snap-acting switches, holding coil switches and indicator lights, as well as electroluminescent panels. The division's manufacturing plants are located at Folcroft, Pa., Chicago, and El Segundo, Calif.

Joseph H. Schellman, formerly president of Hetherington, Inc., has been named president of the new switch unit. New vice president of Controls Co. and director of sales for the Control Switch Div. is Harold F. Ames, former president of Electrosnap.



Harold F. Ames, left, new Controls Co. of America vice president and director of sales for the firm's Control Switch Div., talks with new divisional president, Joseph H. Schellman.

Resistance Welding Business Up

Members of the Resistance Welder Manufacturers Association received more than \$3 1/4 million in new business during January, according to the monthly statistics compiled by the association. This is the highest monthly total in almost three years.

Republic to Up Capital Spending

Capital expenditures of over \$159 million are scheduled for Republic Steel Corp. for 1960. This would be the largest expenditure for capital purposes ever made by the company in a single year.

Newly-announced projects include the installation of hot strip finishing facilities and a 48-inch continuous heavy gauge strip galvanizing line at Republic's Warren, Ohio plant; an additional battery of coke ovens and a plastic coating line for steel pipe at the Youngstown, Ohio plant; relocation and rehabilitation of the eight-inch bar mill at the Canton, Ohio plant; a block of additional soaking pits at the Buffalo plant; special heat treating facilities at the Chicago plant; a new battery of coke ovens and coal chemical producing facilities; and additional soaking pits at the Gadsden, Ala. plant.

Design Engineering Conference

More than 400 companies are expected to exhibit at the Design Engineering Show, May 23-26 at the New York Coliseum. The Design Engineering Conference, which will be held concurrently with the Design Show, will consider advances made in power, control materials, computers, components, and mechanics in order to determine how everyday products may be improved.

The conference will be sponsored by the machine design division of the American Society of Mechanical Engineers.

Inland Steel Expanding Galvanizing Facilities

Inland Steel has announced plans for a 35 per cent expansion of its galvanized steel sheet production capacity. The company is in the process of adding a fourth continuous galvanizing line to the three already in operation in its Indiana Harbor Works in East Chicago, Ind., which reportedly gives it the largest single-plant capacity in this product in the steel industry.

Construction of the new line is underway, and is scheduled for completion



Vitrenamel Steel is a Fixture at Eljer. "We have used USS Vitrenamel in this plant since 1946," says R. M. Wilson, Plant Manager of the Formed Steel Division of Eljer Co., Scranton, Pa. "Our original reason for purchasing Vitrenamel was its reputation for quality, because Eljer's own reputation for quality must be maintained. We've never been disappointed. We like Vitrenamel's ductility, its finish, and its warpage resistance at high temperatures," Mr. Wilson continues. "It has given us consistently good results throughout the years."



Here's a good case of a product living up to its reputation. Eljer's long record of success with Vitrenamel is proof of its quality performance. Vitrenamel sheets take severe forming, and after porcelain enamel coating, fire to a smooth finish free from surface defects. Vitrenamel has high resistance to warpage and sagging at high temperatures—so parts retain their shape. Specify USS Vitrenamel steel for porcelain enameling, available in cut lengths or coils.

USS and Vitrenamel are registered trademarks

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel



in early 1961. It will coat coils up to 60 inches wide at a rate of 300 feet a minute and have a rated capacity of 120,000 tons a year. This will lift the company's total capacity for galvanized sheets and coils to 460,000 tons a year.

Supplemental equipment incorporated in the new galvanizing line will permit the substitution of aluminum coating for zinc, the first facilities Inland has had for making aluminized sheets.

Vulcan Announces Incorporation

The incorporation of Vulcan Associated Container Companies has recently been announced. The move brings under one control the manufacturing facilities in Chicago, Birmingham, Dallas, San Leandro, Calif., Boston, Vancouver, B. C., and Toronto, Ontario. According to the company, the step is being taken to better serve multi-plant steel shipping container users.

Winter Seal Changes Name

Winter Seal Corp., manufacturers of aluminum doors, windows, and extrusions, has been re-named Rogers Industries Inc. Broadened scope of activities in the manufacture of extrusions used in automobiles, appliances, furniture, hardware, electrical construction, and mobile homes prompted the board of directors to establish a new corporate identity.

The company will continue to use Winter Seal as a registered trademark for its storm window division. The company also makes and markets prime windows.

L. R. Kerns Co. Elects New Board of Directors



Newly elected directors of the L. R. Kerns Co., Chicago, and the Kerns Pacific Corp., shown during a recent meeting. Left to right, from the L. R. Kerns Co.: D. E. Fredericks, vice president; J. H. Maris, St. Louis district sales manager; M. H. Schellenberg, secretary-treasurer; B. L. Smalley, president and chairman of the board; S. F. Gordon, executive vice president; B. W. Glenn, vice president, sales; F. A. Zellman, chief chemist. From the Kerns Pacific Corp.: N. E. Ornstein, plant superintendent; A. L. Spalding, president.

B & B Offers Anodizing Services To Other Companies

Brown & Bigelow has announced that it is offering its previously exclusive aluminum anodizing facilities to other companies on a commercial basis. "Since Brown & Bigelow began anodizing with a small pilot plant for governmental work during World War II, we have proved the permanence and brilliance of our colors on millions of Remembrance Advertising pieces," said K. B. Priester, senior vice president, manufacturing.

The firm's processing plant in Minneapolis is expanding its program to include work for outside firms in the metals field.

Chicago Chapter PMI Meeting Held Recently

MPM PHOTO

Display table set up by Porter Precision Products at the recent meeting of the Chicago Chapter of the Pressed Metal Institute. L. Worthington Dodd, general sales manager of Porter, was the featured speaker. He discussed the manufacture of Porter's line of punches and the new standards for punch and die buttons.



McKay to Represent Wean

The McKay Machine Co., Youngstown, Ohio, has agreed to serve as a sales representative to the metalworking industry for Wean Equipment Corp., Cleveland, Ohio.

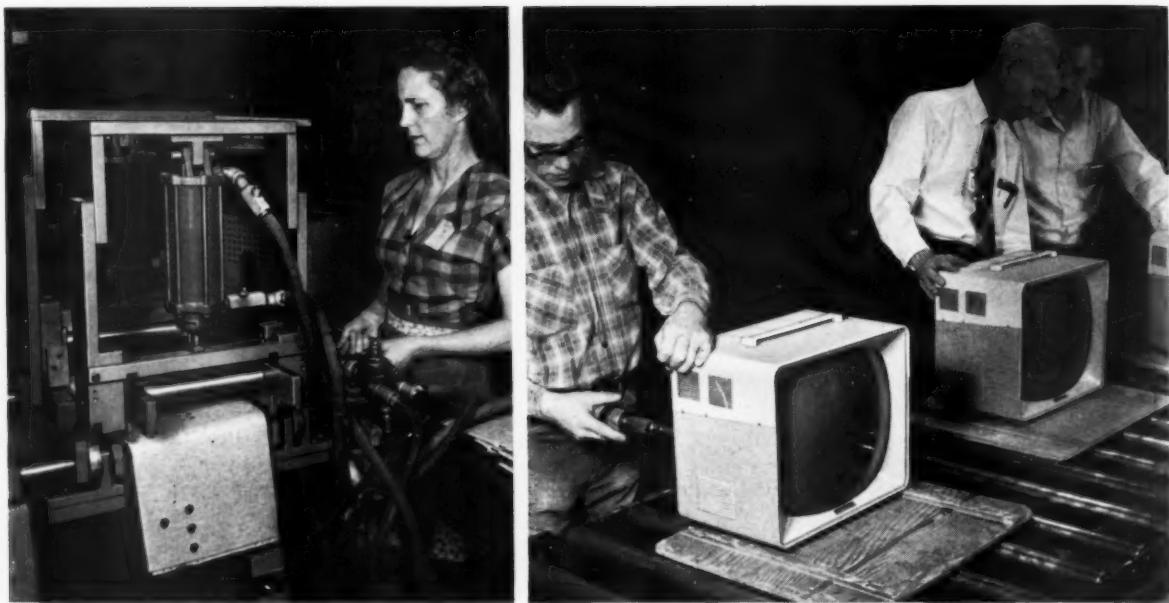
Under the new arrangement, all incoming inquiries will be handled by E. B. James, vice president, sales, of McKay.

Roper's Wright and Waggoner Resign

Stanley H. Hobson, chairman of the board of Geo. D. Roper Corp., Kankakee, Ill., recently announced that John P. Wright had resigned as president and Wm. C. Waggoner had resigned as vice president and treasurer. Both men also resigned as directors of the corporation. Hobson and W. G. Vuksnic were elected president and treasurer, respectively. Harold H. Jeske continues as executive vice president.

Alcoa Announces Organization Changes

Aluminum Company of America has announced the following organization changes: Robert B. McKee, formerly vice president in charge of direct selling and distribution, is now vice president in charge of sales. F. J. Close, formerly vice president in charge of sales development and industry sales, has assumed the newly-established post of vice president and general sales manager. L. P. Favorite, vice president in charge of product sales and commercial research, will continue in charge of these responsibilities. William S. McChesney,



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■ Out of the dies directly into assembly is the procedure in making highly styled television cabinets at Trav-Ler Radio Corporation of Chicago, Illinois. Finishing operations are not needed.

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formerly manager of industry sales, will move to the new post of general manager of market research and planning. George B. D. Peterson, formerly manager of direct selling and distribution, will succeed McKee as general manager of direct sales and distribution. Samuel J. Simmons, Jr., formerly manager of Alcoa's sales development divisions, will become general manager of the sales development divisions and industry sales.

Eastern Enamels Meet

A meeting of the Eastern Enamels Club April 2 will consist of a plant tour of the Sparrows Point plant of Bethlehem Steel Corp. Following the tour, members will be guests of Bethlehem at a luncheon.

BRI Conference Highlights Adhesives

The use of adhesives for drywall construction, for bonding cementitious materials, and in the lamination of structural timber beams will be topics of a two-day conference during the Building Research Institute's three-day spring meeting April 5-7, at the Statler-Hilton Hotel, New York.

NEMA Adds Four Members

The National Electrical Manufacturers Association has announced the addition of four new members: Assembly Products, Inc., Chesterland, Ohio; D Jur Amsco Corp., Long Island City, N. Y.; Markel Electric Products, Inc., Buffalo, N. Y.; and Union Carbide Consumer Products Co., Div. of Union Carbide Corp., New York, N. Y.

New Westinghouse Water Coolers

Two new "wall-hung" water coolers that can be installed flush to the wall with all plumbing concealed and with space underneath for cleaning and waxing the floor, are being introduced by Westinghouse Electric Corp.

One unit has a capacity of seven gallons per hour and the other has a capacity of 11 gallons per hour. Both models can be hung at any desired height, or installed directly on the floor.

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IN MAY, 1960 MPM**

METAL PRODUCTS STATISTICS

		1960 (Units)	1959 (Units)	% Change
Gas Furnaces	January	59,800	63,400	- 5.7
Gas Boilers	January	6,608	6,057	+ 9.1
Gas Conversion Burners	January	7,100	6,700	+ 6.0
Oil-Fired Central Heating Equipment	January	47,977	44,017	+ 9.0
Gas Ranges, Free-Standing	January	110,100	129,400	- 14.9
Gas Ranges, Built-In	January	22,000	19,300	+14.0
Gas Water Heaters	January	215,900	266,200	- 18.9
Gas Vented Recessed Wall Heaters	January	26,400	30,400	- 13.2
Gas Floor Furnaces	January	3,000	6,000	- 50.0
Gas Direct Heating Eqpt.	January	43,200	52,700	- 18.0
Gas Unit Heaters & Duct Furnaces	January	12,800	12,100	- 5.8
Gas Incinerators	January	3,400	2,900	+17.2
Electric Household Refrigerators	January	266,700	256,200	+ 4.1
Electric Farm & Home Freezers	January	53,200	78,800	- 32.5
Electric Ranges, Free Standing	January	67,400	79,200	- 14.8
Electric Ranges, Built-In	January	46,100	41,600	+10.8
Electric Water Heaters	January	48,700	62,700	- 28.7
Electric Dishwashers	January	37,200	35,800	+ 3.9
Electric Food Waste Disposers	January	51,800	48,500	+ 6.8
Combination Washer-Dryers	January	13,964	16,922	- 10.0
Washers—Automatic & Semi.	January	202,943	223,893	- 9.0
Washers—Wringer & All Other	January	51,622	64,598	- 20.0
Electric Dryers	January	74,177	78,593	- 6.0
Gas Dryers	January	37,426	39,627	- 6.0
Vacuum Cleaners	January	258,330	242,516	+ 6.5
Metal Furniture	January	*	*	+ 5.0
†Television	January	526,494	437,026	+20.5
†Radio (1)	January	1,355,788	1,124,737	+20.5
Typewriters	Jan.-Dec.		1,281,674	
Compressor Bodies (2)	Jan.-June		3,080,560	
Steel Barrels & Drums	Jan.-Dec.		33,594,312	
Steel Pails	Jan.-Dec.		80,648,921	
Unitary Air Conditioners (3)	Jan.-Dec.		285,935	
Heat Pumps	Jan.-Dec.		35,167	

(1) Including auto receivers (2) Except for household refrigerators

(3) Including heat pumps * Not reported

† Output — all other figures are factory shipments or factory sales

Sources for this information: Gas Appliance Manufacturers Association, National Electrical Manufacturers Association, American Home Laundry Manufacturers Association, Vacuum Cleaner Manufacturers Association, National Association of Furniture Manufacturers, Electronic Industries Association, Air-Conditioning and Refrigeration Institute, and U.S. Dept. of Commerce.



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MPM

New Industrial Literature

Control Method Brochure

Telecontrol, a management "tool" for controlling production and boosting plant efficiency is used in diversified industries. The control method is described in a new six-page brochure. The literature explains the operation of Telecontrol and how it coordinates and controls in-plant supervision and production activities from a central location. Write M. Wigton, Dept. MPM, Hancock Industries, Inc., 2137 Book Building, Detroit 26, Mich.

Fastener Review

The winter issue of *Fasteners* magazines contains basic fastener standards and specifications. According to the publication, more than 400 plants are producing fasteners in this country and their product adds up to 100 billion parts annually. Literally hundreds of fastener standards are published in this country covering this vast production. These are classified in three groups: national, industry and company. Many of these important standards are reviewed in the article. For a copy of *Fasteners*, Vol. 14, No. 4, write Dept. MPM Industrial Fasteners Institute, 1517 Terminal Tower, Cleveland 13, Ohio.

Die Button Retainers

A new bulletin illustrates the "Ball-lock" type retainers, punches and die buttons made of oil-hardening tool steel of standard thickness, hardened and ground, with hardened back-up plates. The retainers are available in standard-duty and heavy-duty types, made to exact specifications in round, square, rectangular or odd shapes. The contour punches are ground in the direction of the working motion for reduced stripping friction. Write Dept. MPM, Atlantic Special Products Div. of Atlantic Tool & Die Co., 1374 W. 117th St., Cleveland 7, Ohio.

Nicrocoat Data Sheet

A new data sheet discusses physical, chemical and fabrication properties of the protection provided by the Nicrocoat process, covering application methods, thickness specifications and fusing procedures. Write Dept. MPM, Stainless Processing Div., Wall Colmonoy Corp., 19345 John R Street, Detroit 3, Mich.

Air Gaging Handbook

A comprehensive 50-page handbook on dimensional air gaging has recently been published. Written especially for inspection personnel, gage designers, tool engineers and quality control personnel, it describes how to select right amplification for the gaging job, when to use long-range air gages, the advantages and principles of air gaging inside diameters, and many other facets of dimensional control. To obtain a copy of Publication No. X SPG-160, write on company letterhead to Dept. MPM, The Sheffield Corp., Box 893, Dayton 1, Ohio.

Sound Control in Appliances

A new publication discusses methods of sound control in appliances. The 20-page brochure outlines four general categories for added sound treatment, such as absorption, damping, transmission and isolation. Included are 17 graphs, nine tables, and four nomographs, which present data for use as a guide selection of the most effective and economical materials and thicknesses to obtain specific results. The data also aids in estimating the performance of a certain material under specific design condition, and determining preliminary and final design or specifications. For a copy of "Fiberglas Equipment Quieting Materials," write Special Projects Editor, Metal Products Manufacturing, York St. at Park Ave., Elmhurst, Ill.

Stamping Production

Highlights in the production of precision, close-tolerance stampings are graphically described in a booklet just issued. Illustrated is the process from original tooling of the dies through to the final stampings, which are used in assemblies ranging from transistor to razor blade dispensers. Write Dept. MPM, August W. Holmberg & Co., Inc., 133-31-39th Ave., Flushing 54, N. Y.

Gluconate Additives

Gluconate additives for caustic soda-aluminum etching solutions are discussed in a recently issued data sheet. Information provided includes advantages of gluconates, the preparation of soda-gluconate solutions, operational recommendations, storage and handling, and other applications of the solution. For a copy of Data Sheet 549, write Dept. MPM, Chas. Pfizer & Co., Inc., 630 Flushing Ave., Brooklyn 6, N. Y.

RWMA Leaflet

The Resistance Welder Manufacturers' Association has issued a leaflet which tells the story of RWMA's service to industry and its members. It illustrates the many educational aids available to the welding industry and includes an up-to-date list of the association's publications. Write Dept. MPM, Resistance Welder Manufacturers' Association, 1900 Arch St., Philadelphia 3, Pa.

Solenoid-Operated Valves

Newly published literature describes a dishwasher shut-off valve that is said to be unaffected by the tiny particles of dirt found in most incoming water supplies. The single solenoid valve incorporates a new principle — a unique diaphragm and rubber poppet arrangement momentarily hold dirt in suspension, digest it, and pass it through without clogging or damaging the automatic control. Write Dept. MPM, The Dole Valve Co., 6201 Oakton St., Morton Grove, Ill.

Package Testing Equipment

A new catalog describes a line of package testing equipment, including vibration, incline-impact, compression and drop testers. Write Dept. MPM, Gaynes Engineering Co., 1648 W. Fulton St., Chicago 12, Ill.

Motor and Relay Folder

Typical specifications of a complete line of fractional horsepower motors, tachometer generators and ultra-sensitive relays are presented in a four-page folder. Listed are rated horsepower, dimensions, special features and typical applications of motors and relays. For a copy of "Motors and Relays Quick Reference File," write Dept. MPM, Barber-Coleman Co., Rockford, Ill.

Technical Process Bulletins

Four new technical process bulletins have recently been published by a manufacturer of barrel finishing equipment and finishing compounds. Bulletin TPB-2 explains a method developed for imparting lustrous or glossy material finishes to items not expected to retain their "sale" finish after a long period of use. Bulletin TPB-4 goes into the procedures to be followed for the removal of shear marks, concavity and surface defects from raw button blanks as well as the polishing of faced and drilled buttons. Bulletin TPB-3 deals with a process developed for achieving

color, lustre and texture comparable to that achieved by hand buffing. TPB-5 offers information on the preparation of resistor leads prior to tin electroplating and hot dipping. Write Dept. MPM, Tumb-L-Matic, 39 St. Mary's St., Stamford, Conn.

Electroplating Products

A new six-page folder gives detailed information on a complete line of electroplating products, including electro-cleaners, soak cleaners, spray cleaners, buffing compound removers and rust and scale removers. For a copy of "Wyandotte Electroplating Products," write Dept. MPM, Wyandotte Chemicals Corp., Wyandotte, Mich.

Impact Fabrication

The latest developments in the impact process of fabrication are presented in a 34-page, foil-covered booklet. Its 12 main sections outline design possibilities, tolerances, size ranges, and applications of impacts. Among the advances covered are increased size ranges, impact containers and the Alclad impact. For a copy of "Alcoa Impacts — Metal in Motion," write Dept. MPM, Aluminum Co. of America, 724 Alcoa Building, Pittsburgh 19, Pa.

Control Valve Catalog

"Automatic Split-Body Control Valves" is the title of a 20-page publication which contains data on the new "S" and "Y" style split-body valves. Four double-page spreads are devoted to detailed specifications, data and dimensions of the various valve bodies with positioning piston actuators, on-off piston actuators, electro-hydraulic actuators and manual actuators. Write Dept. MPM, Hammel-Dahl Div., General Controls Co., Warwick Industrial Park, Warwick, R. I.

Pilot Light Catalog

Pilot lights that are said to be designed for up to 25,000 hours of operation are described in a detailed catalog. The lights are attached to panels of any thickness by a vibration-proof speed nut. They are available in a variety of styles. Write Dept. MPM, Industrial Devices, Inc., Edgewater 13, N. J.

Infra-Red Bulletin

A 20-page bulletin gives complete information on infra-red heating, including its principles, advantages, applications, and typical standard systems. Write Dept. MPM, Fostoria Corp., Infra-red Div., Fostoria, Ohio.

Flash-Butt Welding

A new 16-page brochure describes the resistance flash-butt welding process and illustrates types of clamping, flash and upset mechanisms. Forty butt-welders are shown and described, together with the welding job done. Write Dept. MPM, The Taylor Winfield Corp., Warren, Ohio.

Electrostatic Painting

The advantages and applications of electrostatic painting are described in a brochure which shows numerous examples of modern production painting in both large and small plants. Also included is a description of an electrostatic hand gun. Write Dept. MPM, Ransburg Electro-Coating Corp., Box 23122, Indianapolis 23, Ind.

ARI Compressor Standards

A new standard for "Sealed Refrigerant Compressors and Condensing Units, 20-Horsepower and Smaller," has been published by the Air-Conditioning and Refrigeration Institute. The new standard, numbered ARI Standard 515-60, covers sealed electric-motor driven refrigerant compressors, as well as air-cooled, evaporatively cooled, and water-cooled, evaporatively cooled, and water-cooled, *to Page 89 →*



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Personals

Westinghouse Electric Corp. has announced four appointments. **W. Nelson Abbott** has been named merchandise manager of the room air conditioner department; **Harry W. Chenet**, previously Atlantic regional manager of Total Electric Home, is merchandise manager for washers and dryers; **Charles R. Evans**, formerly manager of sales training for laundry equipment, is merchandise manager of combination washer-dryers; and **Dale C. Haynes**, formerly regional field director of special accounts, is merchandise manager of mobile home and pre-fab sales in the contract sales department.

M. R. Van Zanten is the new president of **Swan Mfg. Co.**, manufacturer of baseboard heaters, wall heaters, and thermostats. The appointment of **William Leiner** as vice president in charge of production was also announced.

Richard L. Custis and **Douglas P. Brush** have been promoted as part of **Ferro Corp.**'s expansion of its marketing division. Custis was named corporate advertising manager, and Brush takes the new title of public and product information manager.

George A. Karl is the new manager of marketing research for **DeSoto Chemical Coatings, Inc.** He will be located at the company's executive offices in Chicago and his activities will involve consumer and industrial products, including wall coverings.

I. L. Griffin has been appointed general manager of the refrigeration department of the **Hotpoint Div., General Electric Co.** He is replacing O. E. Wolf, who will retire June 1 and become a consultant to W. C. Wichman, vice president, General Electric.



ABBOTT



WILSON



SPIERS



MILLER

William V. Wilson has been named assistant director of purchases at **The Maytag Co.** Wilson joined Maytag's purchasing department in January, 1946, and has served as buying supervisor since November, 1958.

Maytag also announced the appointment of **Harold Ellefson** as superintendent of production and **Russell Williams** as supervisor of maintenance, tool room and plant protection.

Donald O. Moore has been appointed assistant market manager for national accounts of **Lennox Industries, Inc.** He will headquartered in New York City.

Raymond N. Anderson has been appointed plant manager of the Warren Metal Base operations of **Sylvania Products, Inc.** Anderson will be responsible for the entire operations of the metal base plant which produces aluminum "bayonet-type" photoflash bases and "threaded-type" incandescent lamp bases for the lighting industry.

Harold F. Ames has been elected a vice president of **Controls Co. of America**. He has also been named director of sales of the recently-created **Control Switch Div.**, a combination of the former subsidiary, Hetherington, Inc., and the former Electrosnap Corp.

Marvin P. Wilson has been named divisional comptroller for **Kelvinator's** U. S. appliance division. His duties will include coordination of plant accounting and costs, financial forecasts, and product price data. For the past three years, Wilson has been assistant to the manufacturing manager of Kelvinator.



KARL



GRIFFIN



AMES



WILSON



WHITSIT



MCGUIRE

Harry R. Spiers has been promoted to service manager of the enamel division of **Pemco Corp.** Spiers spent several years as a Pemco sales and service engineer in the Texas and California territories. Since 1955 he has been assistant service manager for enamels.

A. P. Miller has been elected president of **Acme-Newport Steel Co.**, a subsidiary of **Acme Steel Co.** Miller moves up from his post as vice president and general manager of Acme-Newport.

Ralph S. Michael, Jr., has been appointed manager of industrial finishes for the **Paint Div. of Pittsburgh Plate Glass Co.** He joined the company in 1940 and had served as assistant general manager of industrial finishes sales in the company's Pittsburgh office before his recent promotion.

G. M. Stewart has been appointed to the newly-created post of director of materials for **The Sunray Stove Co.** Stewart will be responsible for all materials used by the company from the initial purchasing phase to the actual consumption of the materials in their manufacturing processes.

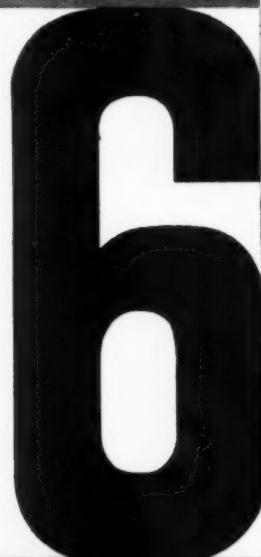
Lawrence C. Whitsit has been elected vice president in charge of manufacturing of **Ed Friedrich, Inc.** Whitsit joined Friedrich in November, 1957. Prior to that, he was assistant works manager at the Detroit plant of Nash Kelvinator.

Marc McGuire has been promoted to the post of sales manager of **Utility Fan Corp.**, a division of **Utility Appliance Corp.** He was formerly assistant sales

ROSS

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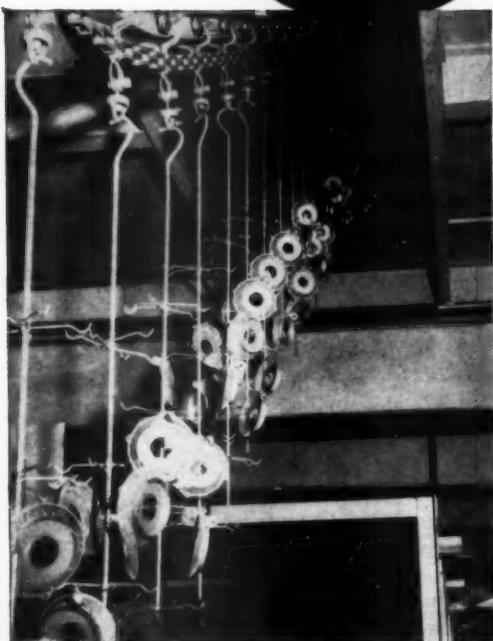
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New Formulations

Broad Targets for Modernizing Your Paint Finishing Section



Considering your paint finishing department as a whole there are several operations where modernization by means of the modern Ross Unit or System might pay off quickly in operational savings: dryer, oven, controls, automation, fans, conveyors, hook-loads, travel cycles...all of which are included in the broad list above.

Any unit that has been in service, say, five years or more is approaching obsolescence, if not already in that cost-hiking state. It places a burden on your competitive situation...a burden that viciously pyramids.

Why not ask a Ross Paint Finishing Specialist to study your layout and report back? He'll be glad to do it. And he has the broad paint finishing experience to do an intelligent, objective job. A phone call or letter to our nearest office will have him there shortly.



J.O. ROSS ENGINEERING
Division of Midland-Ross Corporation / 730 Third Ave., New York 17, New York
ATLANTA • BOSTON • DETROIT • LOS ANGELES • SEATTLE • MT. PROSPECT, ILL.

manager and, in his new capacity, will supervise a planned expansion of Utility Fan.

The Armclo Div., Armclo Steel Corp., has announced seven major promotions. **G. W. Breiel**, manager of western area sales, assumes the new position of manager of sales administration. **Sidney A. Yager**, district manager of the Chicago sales office, becomes manager of western area sales. **Paul Pardonner**, district manager of the Detroit sales office, moves up to manager of central area sales.

J. B. Rafter, assistant manager, stainless bar and wire sales, advances to assistant manager of eastern area sales. **Robert E. Getter**, salesman in the Cincinnati district sales office, moves up to district manager of the Detroit sales office. Also, **William L. Sandston**, former senior economic analyst for Armclo Steel Corp., has been promoted to supervisor of economic research for the company.

Lawrence E. Murphy has been appointed manager of major appliance accounts of **Admiral Sales Corp.** Prior to joining Admiral he was major accounts manager for Westinghouse.

Raymond H. Matthews has been named chief engineer of the **Wilcolator Co.** Prior to this appointment, Matthews spent six years as chief engineer with Fenwal, Inc., and four years as an application engineer for W. M. Chace Co.

Seymour Mintz has been named assistant to President Harry T. Silverman of **Landers, Frary & Clark**. Mintz will be responsible for developing the merchandising and promotion programs for the company products. To accept this position, Mintz resigned his post as president of Baum Corp. He has recently been president of CBS Columbia, the manufacturing division of the Columbia Broadcasting System. He was also vice president and a member of the board of directors of the parent company. Prior to this he was vice president in charge of marketing for the Admiral Corp.

MATTHEWS



MINTZ



YAGER



PARDONNER



BREIEL



SANDSTON

Controls Company of America has announced three major appointments. **George D. Becker** has been named general manager of the Heating and Air Conditioning Div. Although the division is located in Milwaukee, Becker will remain at the company's Schiller Park headquarters. He is also vice president of operations. **Donald M. Strathearn**, vice president, has been promoted to general manager of the Appliance and Automotive Div. He was formerly director of Appliance and Automotive Controls sales. Succeeding Strathearn is **John A. Kovas**, who joined Controls Co. last November. Rounding out the management team for the Appliance and Automotive Div. are **William W. Mansfield**, director of manufacturing; **Paul H. Williams**, director of engineering; and **Aaron Simon**, controller.

Copeland Refrigeration Corp. has announced three executive appointments. **Ernest Kroder** has been appointed chief engineer of the standard products line, **Walter Runciman**, former service manager of Brunner Div., Dunham-Bush, has been named assistant to the national service manager, and **Arne Pertola** has been appointed manager of field educational services.

Robertshaw-Fulton Controls Co. has named two assistant vice presidents; **Henry F. Hild** and **D. Rex Scott**. Hild is general manager of the firm's Indiana Div., and before joining Robertshaw was vice president in charge of manufacturing at Procter Electric Co. Scott is general manager of the firm's Western Research Center. He joined the company in 1950 as a patent attorney.



KOVAS



STRATHEARN



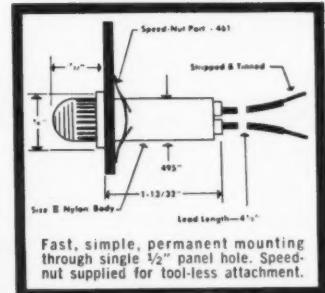
BECKER



PERMANENT PILOT LIGHT

OMNI-GLOW

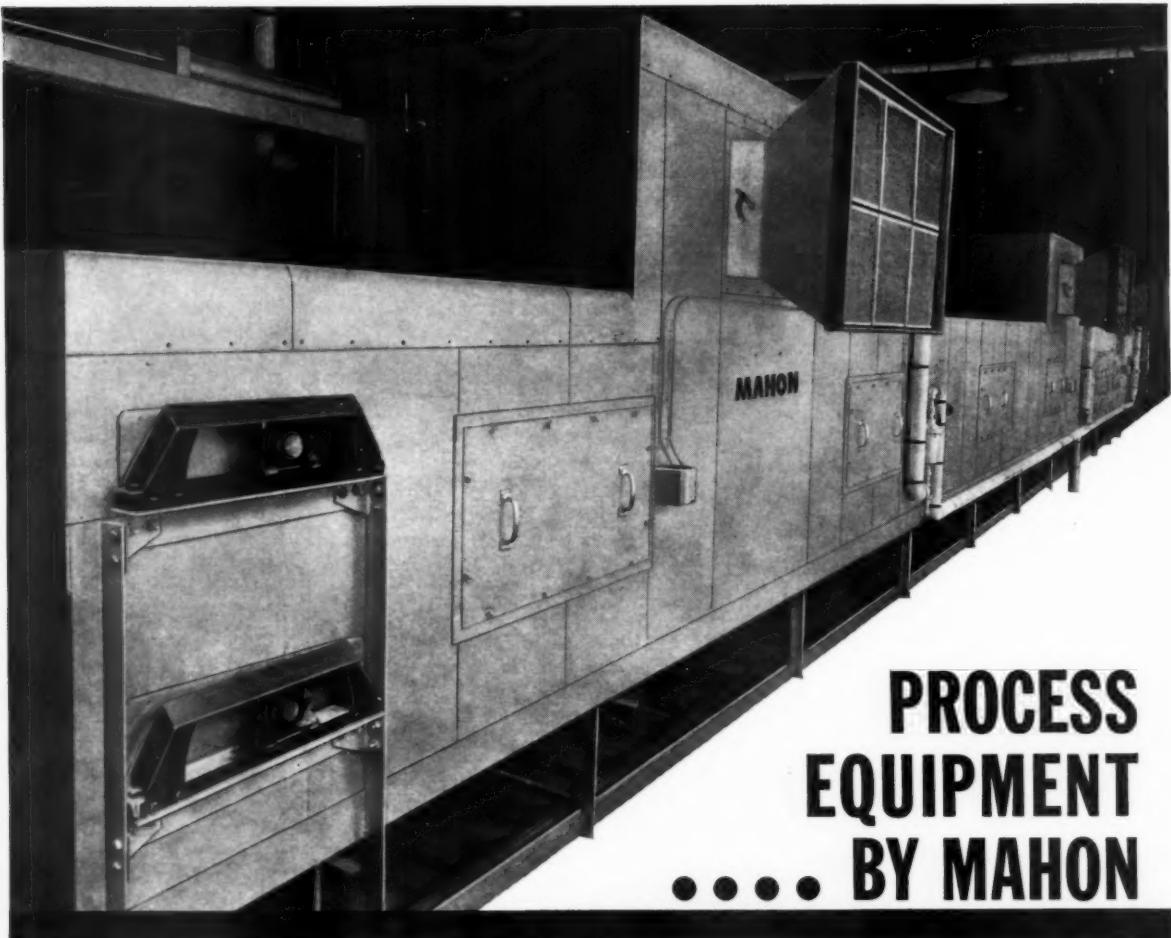
ADD GLOW TO THE
LIFE OF YOUR PRODUCT



OMNI-GLOW Pilot Lights are designed for up to 25,000 hours of operation—providing glow for the life of your product. OMNI-GLOW is easily attached to panels of any thickness by a vibration-proof speed nut—combining permanent fool-proof mounting with production economy. Ruggedly constructed to withstand rough duty service, OMNI-GLOW is available in a variety of styles to meet your design requirements. Write today for a sample and detailed catalog.

WRITE FOR COMPLETE TECHNICAL MANUAL
AND OMNI-GLOW CATALOG...

Industrial Devices, Inc.
EDGEWATER 13, NEW JERSEY



PROCESS EQUIPMENT . . . BY MAHON

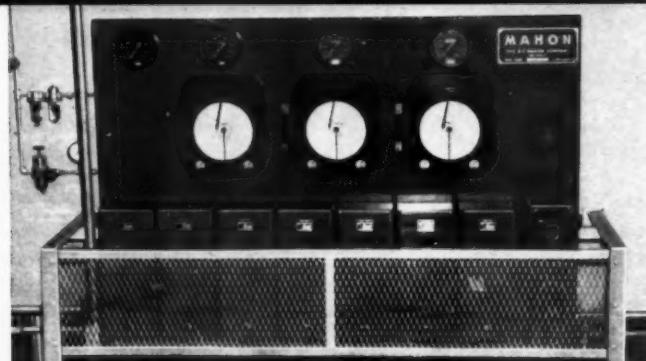
new plastic-curing oven system for GOODYEAR is double-decked for efficiency

Curing of 75-ft. long, 7-ft. wide sections of a spongy plastic material, with heating and cooling cycles rigidly controlled, is a tough processing problem. Mahon equipment does the job two-at-a-time . . . and also automates the method! This new oven system converted the operation to a smooth, continuous process.

The unusual installation (shown above) is 80-ft. long with double-decked ovens for increased capacity. Specially developed by Mahon and Goodyear engineers, the system features integrated materials handling, precisely controlled heating and rapid cooling. Curing is done at preset temperatures up to 300°F, the ovens holding the plastic sections for about eight hours. At the end of this cycle, the entire system is fast cooled, the work discharged and the ovens brought back up to heat—all automatically.

If you are considering new or improved process equipment call in a Mahon engineer . . . their assistance could prove invaluable.

Manufacturing Plants—Detroit and Los Angeles, Calif.
Sales-Engineering Offices in Detroit, New York,
Chicago, Los Angeles and San Francisco



Special oven control panel, designed by Mahon for the Goodyear Tire and Rubber Co., monitors the entire eight-hour curing cycle for the plastic material.

Write for Descriptive Catalog A-660 on the scope of
Mahon Industrial Equipment for metal finishing,
cleaning, painting, heating, heat treating, etc.
Also in Sweet's Plant Engineering File.

THE R. C. MAHON COMPANY
Detroit 34, Michigan

YOUR BIGGEST VALUE is in MAHON'S
planning and engineering EXPERIENCE

MAHON

Industry Meetings**ELECTRIC INSTITUTE**

The 26th Annual Sales Conference of the Edison Electric Institute, Edgewater Beach Hotel, Chicago, April 4-6, 1960.

PACKAGING

American Management Association's 29th National Packaging Exposition, Convention Hall, Atlantic City, April 4-7, 1960.

TOOL AND MANUFACTURING ENGINEERS

The American Society of Tool and Manufacturing Engineers' Engineering Conference and Exhibit, Detroit, Mich., April 21-28, 1960.

KITCHENS INSTITUTE

Better Kitchens Institute's Annual Meeting and Conference, French Lick, Ind., April 23-25, 1960.

CERAMICS

The 62nd Annual Meeting of The American Ceramic Society, Bellevue Stratford Hotel, Philadelphia, Pa., April 24-28, 1960.

WELDING

The American Welding Society's 41st Annual Convention and Welding Exposition, Los Angeles, Calif., April 25-29, 1960. (Technical Meetings, Biltmore Hotel, April 25-29; Welding Show, Great Western Exhibit Center, April 26-28).

HOME LAUNDRY

The American Home Laundry Manufacturers' Association's 1960 Convention, The Diplomat Hotel, Hollywood-By-The-Sea, Florida, April 27-29, 1960.

AIR CONDITIONING

The Air Conditioning Industries Association's Western Air Conditioning, Heating, Ventilating, and Refrigeration Exhibit and Conference, Shrine Exposition Hall, Los Angeles, Calif., April 27-30, 1960.

ARCHITECTURAL METAL

The 22nd Annual Convention of the National Association of Architectural Metal Manufacturers, Boca Raton Hotel and Club, Boca Raton, Fla., May 1-7, 1960.

CASTINGS

1960 Castings Congress and Exposition, Convention Hall, Philadelphia, May 9-13, 1960.

METALS SHOW

The American Society for Metals' 2nd Southwestern Metal Congress, Sheraton-Dallas Hotel, May 9-12, and 2nd Southwestern Metal Exposition, State Fair Park, May 9-13, Dallas, Texas.

APPLIANCES

The American Institute of Electrical Engineers' 11th Annual Appliance Technical Conference, Mansfield-Leland Hotel, Mansfield, Ohio, May 16-17, 1960.

DESIGN ENGINEERING

The American Society of Mechanical Engineers' Design Engineering Conference and Show, Statler-Hilton Hotel, New York City, N.Y., May 23-26, 1960.

Textured metal trends

Perforated and painted textured metal is used as a grille on the side of this automatic typewriter. The Bristol texture adds beauty and durability.

TEXTURED METAL formed by passing flat metal sheets or coils through a series of synchronized male and female rolls under accurately controlled pressure is gaining increased attention throughout the metal products field.

The metal is redistributed above and below a neutral axis forming small trusses which, together with the cold working, strengthen the metal in several directions. The textured metals not only

become more rigid than the original sheet with no gain in weight, but provide a surface with many cost-saving and functional properties.

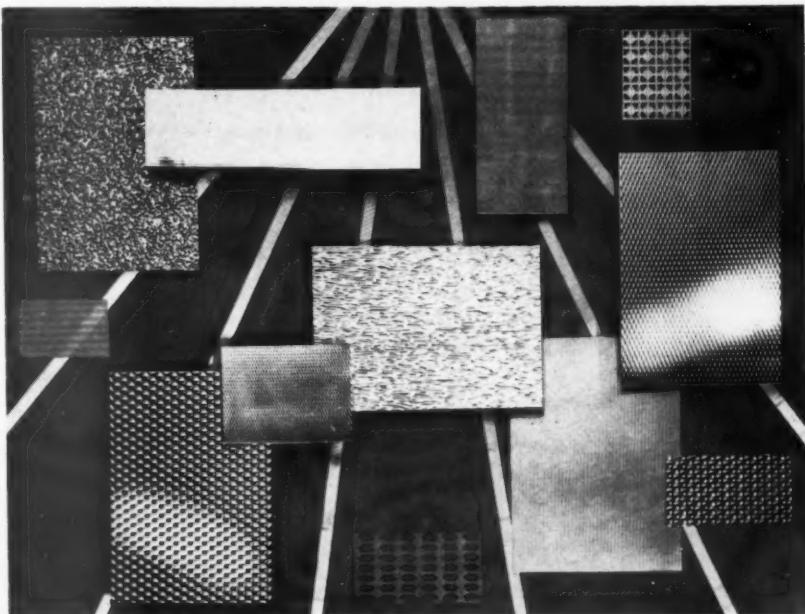
Ardmore Products, Inc., Roselle, N.J., produces textured metals in eight standard patterns plus special textures to suit individual requirements. Perforated textured metals are also produced. The metal can be textured in sheets up to 52 inches in width and in continuous coils in widths to 48 inches.

The company says textured metals are as easy to fabricate as plain flat metal and that they can be welded, soldered, riveted, and lock-seamed. Standard sheet metal equipment is used for blanking, punching, drawing, and forming, with minor adjustments for cross-sectional thickness (metal thickness plus depth of texture).

Textured metals have had applications in architecture, commercial and consumer goods, and transportation. Architecturally, the metal has been used for curtain wall panels, interior panels and trim, door kick plates, and aluminum roof panels. In the commercial goods field, beverage coolers, dictation machines, and vending machines have incorporated textured metal for trim and accent panels. Ladders, ice buckets, mail boxes, and space heaters are some of the consumer goods that have used textured metal to functional and decorative ad-

to Page 85 →

Some of Ardmore Products, Inc.'s textured and perforated metals.





Hotpoint

**ELIMINATED SHIPPING DAMAGE with
CHICAGO MILL CONTAINERS!**

"Up to about two years ago, shipping damage to the thermostats and grease troughs on Hotpoint's HRG7 SUPERline commercial electric ranges was occurring at an alarming rate. With Chicago Mill's engineering assistance shipping containers were designed specifically to provide total protection for these units, thereby eliminating this problem."

Ed Wach, Packaging Engineer
Hotpoint Commercial Equipment Department

LARGE OR SMALL - CHICAGO MILL MAKES 'EM ALL!
A COMPLETE LINE OF CONTAINERS FOR EVERY SHIPPING PURPOSE!

FREE! Illustrated Catalog Describing Chicago Mill's Shipping Containers and Services!



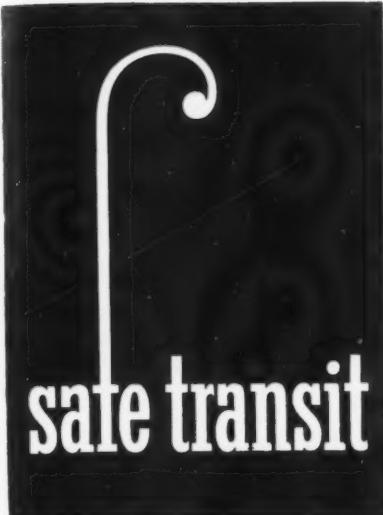
CHICAGO MILL AND LUMBER COMPANY

33 South Clark Street

Chicago 3, Illinois

PLANTS

- CHICAGO, ILLINOIS
- GREENVILLE, MISSISSIPPI
- HELENA, ARKANSAS
- ROCKMART, GEORGIA
- TALLULAH, LOUISIANA



safe transit

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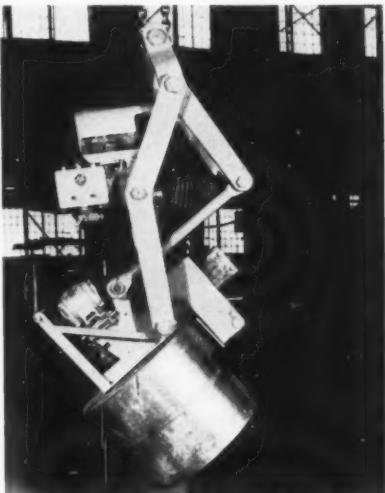
Elmhurst, Illinois

editorial voice of the national safe transit program

devoted to improving packaging methods and shipping and materials handling methods for the appliance and metal products manufacturing industries. This section contains plant experience information and industry advances for the use of all executives and plant men interested in improving packaging and shipping methods and in loss prevention. The section contains complete information on the national safe transit pre-shipment testing program for packaged finished products and detailed reports of divisions and sub-committees of the National Safe Transit Committee.

Coil Lifting, Tilting Mechanism

A combination coil lifting and tilting mechanism for use in steel, aluminum, and brass mills, and warehouses, has been developed by American Forge and Mfg. Co., McKees Rocks, Pa. Designed to handle coils ranging from 5,000 to 30,000 pounds, and operated either from the crane cab or from pendant controls, the mechanism can lift and tilt from vertical to horizontal, or vice versa, in about 45 seconds.



Holding mechanism is powered by an electric motor through a gear reducer. This applies an initial grip through one wall thickness of the coil. The coil is held by self-gripping shoes to eliminate any chance of the coil being dropped while being moved. When the coil is lifted, the turning mechanism is placed in operation. This is actuated through a worm gear screw jack, also powered by an electric motor.

Use of the development is said to eliminate the use of conventional lifting tongs, floor-mounted tilting devices, and "C" hooks for handling the tilted coil during production and warehousing operations. Because of the reduced number of handlings with the device, it is claimed that there are considerable savings in handling time, and less chance of coil damage.

Tiny Tractor for Heavy Loads

A tiny tractor, said to move materials in confined quarters where power, compactness, and agility are required, has been introduced by Northwestern Motor Co., Eau Claire, Wis. Called the Tow-Mite, the tractor is powered by a 4-hp gasoline engine, and is said to develop 630 lbs. drawbar pull. It is also available with a 7-hp engine that develops

approximately 1,000 lbs. drawbar pull. Both engines may be converted to liquid propane if required.

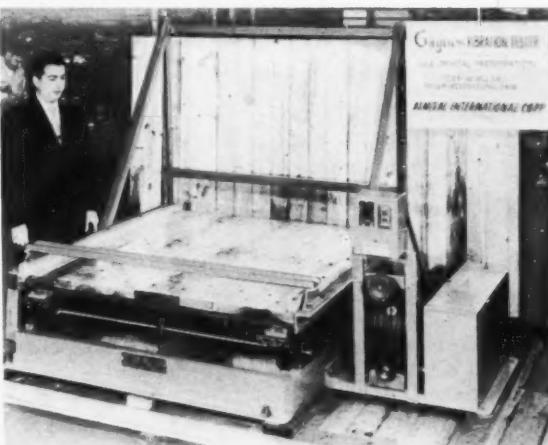
Speed control and brakes are operated by foot pedals, and the tractor is able to turn on a 38-inch wheel radius. The unit has dual rear tires and three forward speeds. The rear hitch is of the pull-pin type, or can be made to buyer's specifications.



Vibration Tester to International Fair at Milan

A Gaynes Style No. 125-V vibration tester is being shipped to Milan, Italy for exhibition by Admiral International Corp. at the Milan International Fair. The tester will be used to demonstrate one of Admiral's quality control methods for packaging.

The tester was manufactured by Gaynes Engineering Co., 1642 W. Fulton St., Chicago, Ill.





Packaging the Hotpoint HRG7 Superline commercial electric range.

EXCLUSIVE MPM PHOTO

Packaging and handling commercial cooking equipment

AN MPM STAFF FEATURE

FOOD PREPARATION on a commercial scale is an industry that requires many types and sizes of cooking equipment. General Electric's Commercial Equipment Dept., Chicago Heights, Ill., manufactures a line of electric commercial cooking equipment to meet volume food service requirements ranging from the smallest restaurant to massive hospitals.

Naturally, plants manufacturing equipment in such a variety of types and models must have flexible packaging and shipping facilities. At the Commercial Equipment Plant, over 100 varieties of devices are produced, 40 of

which are high-production items. This variety necessitates the use of a great number of different types and sizes of containers in five basic varieties.

Included in the Hotpoint line of commercial cooking equipment are electric ranges, electric broilers, deep-fat frying machines, electric bake, roast, and pizza ovens, trunnion kettles, steam cookers, electric griddles, "baker's stoves," and a line of combination (modular) units. Of course, the equipment is available in many models and sizes.

To pack and ship this array of equipment, five types of containers are employed: cleated corrugated; cleated plywood; slatted-nailed; export cleated plywood; and company-built, solid-wood crates to meet U. S. government specifications. The plant also manufactures General Electric water coolers which are packed in all-corrugated containers.

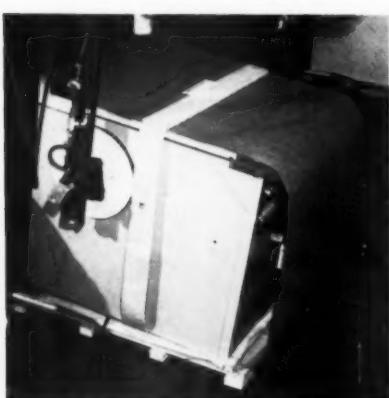
Safe Transit tests employed

Careful study of design details and rigorous testing go into the development of new containers. Packaging engineer Ed Wach works closely with suppliers in designing containers for new equipment or modifying existing containers. All crates and cartons are tested according to National Safe Transit specifications.

EXCLUSIVE MPM PHOTOS

(Left) — Range is raised by suction-type lift and steel band is positioned. Preceding this step, range was internally braced, hotplates were coated with a protective grease and covered with grease-proof paper, and the range was wrapped with Kraft paper to discourage pilfering.

(Right) — Completing the steel banding. Next step is to position and nail end panels of the inner crate assembly and install bracing to prevent damaging shifting of the top castings. The outer crating is then tack-nailed in position, and range moves on for final nailing.





EXCLUSIVE MPM PHOTO

Ed Wach, packaging engineer at the Commercial Equipment Department.

While the NST tests are presently conducted outside the plant, construction of the department's own testing facilities is now under way.

But General Electric goes a step further than lab tests and makes test shipments of all containers used with Hotpoint commercial devices before they are finally accepted. The usual procedure in conducting a test shipment is to crate the piece of equipment in the pro-

posed container and ship it to the East Coast, a destination requiring a maximum amount of handling and railroad car switching. All test shipments are shipped back to the Chicago Heights plant. Half the trip is scheduled by truck and the other half by rail.

When the packaged product under test arrives back at the plant, Wach personally uncrates it and notes the condition of the crate and the equipment. No container is accepted as a production item unless both the laboratory tests and the trial shipments are satisfactory.

Commercial range packaging

Of the five packaging lines in the plant, the oven and range line is the best example of large-scale packaging of commercial equipment. One of the major items on this line is the HRG7 Superline commercial electric range, units of which are packaged at a high daily rate, along with other models of ovens and ranges.

The crating history of this unit points up the benefits of careful crating design to eliminate shipping damages. In this case, a minor modification did the trick.

Early trouble was caused by the combination griddle-hotplate sections on top of the range. These three heavy castings



Hotpoint HRG7 Superline commercial electric range in use at Lincoln Savings & Loan Association, Los Angeles.

would shift when the crate was bumped or jarred. The control shaft leading to the thermostat on the bottom of the casting would be bent. Also, the grease troughs on the sides of the range would

EXCLUSIVE MPM PHOTOS

A nail shooting gun is used for final nailing. Nailing with the gun is 64 per cent faster than hand nailing. A total of 72 nails is used in packaging the HRG7.

Packaged ranges are transferred by elevator to storage area where they are stacked by fork-lift trucks. Forks on truck shift left and right for accurate tiering.





Learn how your plant, too, can **SAVE ON PACKAGING** *...meet the man from Wirebound*

What you see above are a few typical containers used by many of the leading firms that have joined the swing to Wirebounds. Specifically, these Wirebounds are used to ship ① automatic washers, ② carboys, ③ unit heaters, ④ sinks, ⑤ bathtubs, ⑥ fire brick, ⑦ meat, ⑧ water meters, ⑨ electric motors, and ⑩ plastic pellets.

Despite this diversity, all these containers have several points in common. First, each was custom engineered for the product it carries. Each combines the desired protection . . . with maximum savings in time, labor, weight and container costs. And each one began with a visit from the nearby Man from Wirebound.

Why not have the Man from Wirebound pay your plant a visit? A qualified packaging engineer, he'll be happy to study your methods . . . offer money-saving suggestions . . . and even submit free sample Wirebounds for testing. There's no obligation. Use the handy coupon below.

FREE: Write for informative booklet,
"What to Expect from Wirebounds."



IT GETS THERE RIGHT IN
Wirebound
BOXES & CRATES

WIREBOUND BOX
MANUFACTURERS ASSOCIATION
Room 1461 222 West Adams Street
Chicago 6, Illinois

0204

- Please have the Man from Wirebound call on me
 Please send FREE booklet "What to Expect from Wirebounds"

Name _____

Title _____

Company _____

Address _____

City _____ State _____

be damaged by the shifting castings. A method of anchoring the castings during shipping was needed.

Since the slatted-nailed crate used for this range was acceptable in all other respects, it was decided to modify it rather than attempt a new design. After extensive experimenting, a method of inter-blocking and bracing was developed that reduced the damage rate from eight per cent to zero. The modification consisted of the addition of four pieces of waterproof plywood which acted as a top bracing for the castings. By crossnailing these pieces to the end of the inner crate frame, the castings were secured and couldn't shift in transit.

Packaging operation for the HRG7 begins as the ranges move on a roller-type conveyor from final inspection and testing. The ranges are transported on the bottom section of the crate which serves as a pallet. First step in the two-man packaging line is the wood bracing of the inner oven, including the rack and deck. Next, the pilot light and the oven trays are secured with tape, and a non-toxic rust preventative is applied to the top of the hotplate sections. The hotplates are covered with grease-proof paper, and heavy Kraft paper is wrapped around the unit to discourage pilfering. Then a board is placed across the width of the hotplate section, and a steel band is wrapped over the board and around the range to prevent movement of the hotplate castings during installation at final destination. A suction-type lift is employed to lift the range for the banding operation.

The same employee then positions and nails the end side panels of the inner assembly and installs the bracing to prevent lateral shifting of the top castings. He then tack-nails the outer crating and moves the unit down the line for final nailing.

Nail-shooting gun reduces nailing time 64 per cent

A nail-shooting gun recently replaced hand nailing in this final operation and, according to packaging engineer Wach, nailing time has been reduced approximately 64 per cent. A total of 72 nails are used in the complete packaging operation.

From the packaging line, the crated ranges are moved to an elevator where they are transported to the floor below and stacked to await shipment. Fast, accurate tiering of the ranges is accomplished with a forklift truck, which has laterally-moving forks.

New spray-applied decorative finishes for metal products

THE DEVELOPMENT of a new system for the spray application of decorative vinyl finishes to a wide variety of consumer and industrial products has been announced by Donald W. Oakley, vice president of Metal & Thermit Corp.

It is claimed the new system makes possible application of vinyl dispersion coatings to plain or textured metal — steel or aluminum — after it has been fabricated, resulting in savings over previously-used methods which start with pre-laminated or pre-coated metal sheet.

The manufacturer states that vinyl has been proved an outstanding surface for metal because of its excellent corrosion resistance, toughness, resiliency, color range, and high resistance to scratching, scuffing, and abrasion. Vinyl is chemically inert and odorless, as well as highly resistant to acids and alkalies, oils and greases, and alcohols.

In the early 1950's, vinyl sheeting entered the product finishing field. It worked well when applied with adhesives to flat metal surfaces. But problems were presented in attaching it to more complicated and contoured parts.

Subsequently, vinyl film was laminated to metal sheet prior to any fabrication. This could be done at lower cost, and at high production rates. Much

material of this type is being used today. It is estimated that capacity exists to produce close to 140 million square feet of vinyl-metal laminates annually.

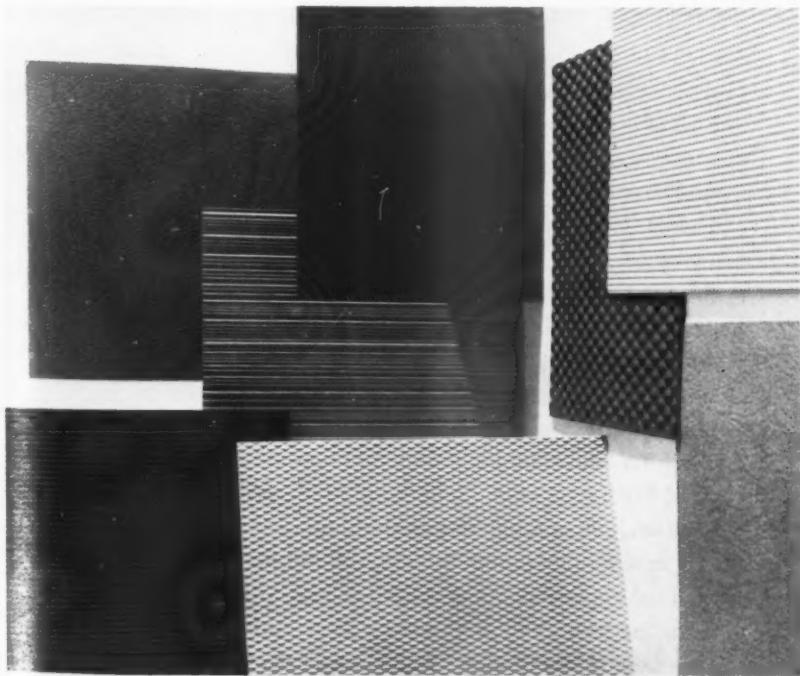
Recently, pre-coated steel sheet was announced. This process differs from lamination in that a vinyl plastisol is roller applied to steel strip on a continuous basis. Present capacity to produce this pre-coated sheet is estimated at approximately five million square feet annually. The manufacturer estimates that approximately 30 million square feet of these two types of vinyl-metal combinations were sold in 1959.

Pre-textured metal is available from at least three sources in the steel industry, and from most of the aluminum producers. There is a wide variety of standard textures; specials can be obtained in either material. The premium for texture adds from 5 to 20 per cent to the cost of the metal. These advantages are claimed for spray-applied vinyl dispersion finishes:

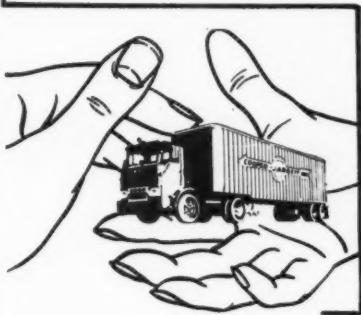
1. Applied to the finished part, therefore requiring no special care in handling metal during fabrication. Faster production possible.
2. Finish applied in the fabricator's own shop using standard spray equipment (also electrostatic spray).

to Page 96 →

Sprayed vinyl organosol finishes on a selection of textured metal panels.



YOU... THE TRAFFIC MAN... WANT
**FAST, SURE,
DEPENDABLE
DELIVERY**



MAXIMUM MAINTENANCE means time saving starts . . . faster customer delivery . . . from **THE TRAFFIC MAN'S LINE**. A complete IBM-teletype system keeps watch over your every shipment from the time of loading until delivery . . . this factor plus **MAXIMUM MAINTENANCE** of all Cooper-Jarrett equipment gives you the service you need and want every day . . . Yes, you get it from **THE TRAFFIC MAN'S LINE** . . . from Cooper-Jarrett.



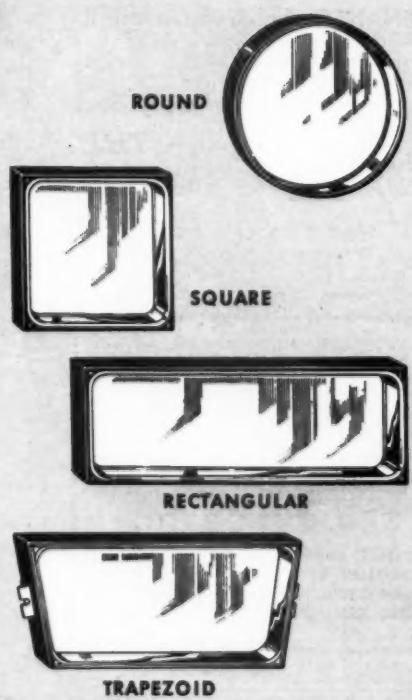
CHICAGO, ILLINOIS
CLEVELAND, OHIO
PHILADELPHIA, PA.
JERSEY CITY, N.J.
TRENTON, N.J.
KANSAS CITY, MO.
WALLINGFORD, CONN.
NEW YORK, N.Y.

PERMA-VIEW windows...

from

* 3275% sales increase in 9 years proves
Perma-View's wide acceptance.

The universally accepted PERMA-VIEW oven windows



This scientifically designed window, now used in gas and electric ranges produced by leading manufacturers throughout the United States, Canada, and many foreign countries, has now found other practical and useful applications.

PERMA-VIEW windows are now being used for such varied applications as pizza ovens, walk-in coolers, bakery tunnel ovens, commercial roast ovens, and laboratory ovens.

These varied and demanding applications for which PERMA-VIEW windows are being used help to show the quality and durability of this product. The strong steel enclosed, double pane PERMA-VIEW window incorporates the finest quality heat resisting glass. It is mechanically sealed to prevent infiltration of vapors and to eliminate "fogging." Any shape, any size, any thickness can be manufactured to meet your engineering requirements.

Mr. John R. Kauffman, President, "Speedster" Inc., Denver, Colorado, states, "The 'Speedster' ovens are doing an outstanding job in the food service-restaurant equipment field. They are widely used for pizza up to 650 degrees Fahrenheit, as well as normal baking operations up to 550 degrees. Mills Products has an outstanding line. Their products are good, and we are pleased with their service, quality, and design . . . they stand out far better than the manufacturer guarantees."

 3275% SALES INCREASE

Photo courtesy "Speedster" Inc., Denver, Colorado. This "Speedster" baking oven is widely used throughout the restaurant field for pizza and other baking operations.



m pizza ovens to laboratory ovens

Photo courtesy Despatch Oven Company, Minneapolis, Minnesota. This is a Despatch Saf-T-Bilt laboratory oven, incorporating three PERMA-VIEW windows, precision engineered and manufactured to give exact temperature uniformity and hazard-protection.

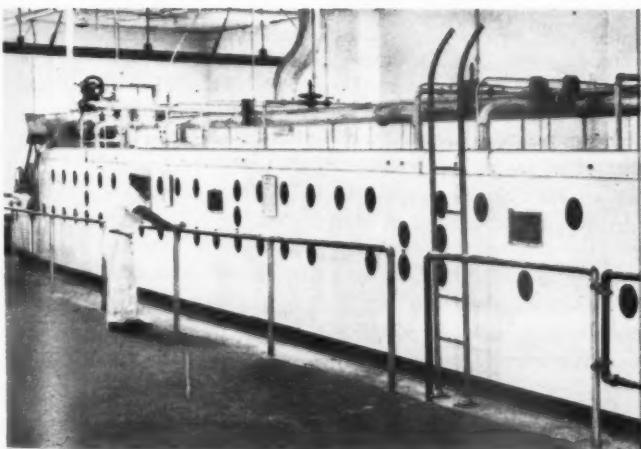
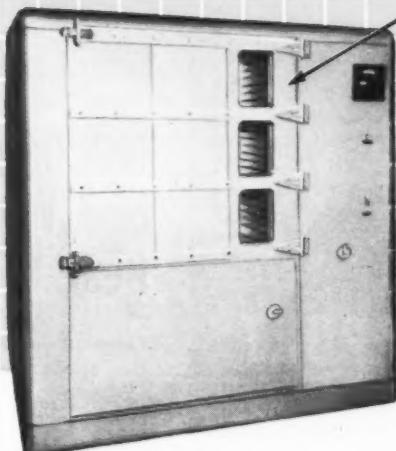


Photo courtesy Baker Perkins Inc., Saginaw, Michigan. This photo shows two PERMA-VIEW inspection windows in the operating side of a Baker Perkins Tunnel Oven installed in a commercial bakery.



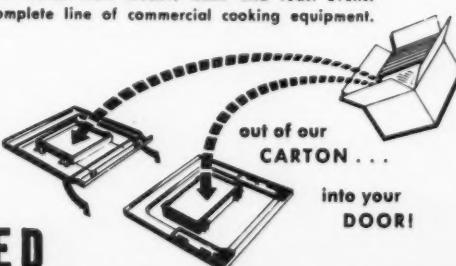
Photo courtesy Vulcan-Hart Corp., Louisville, Kentucky. This is one of the Vulcan-Hart electric bake and roast ovens. Part of a complete line of commercial cooking equipment.

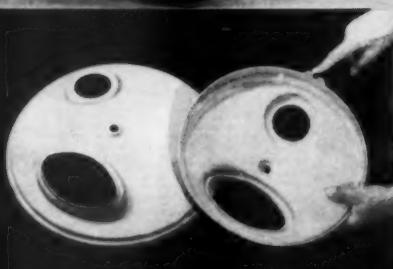
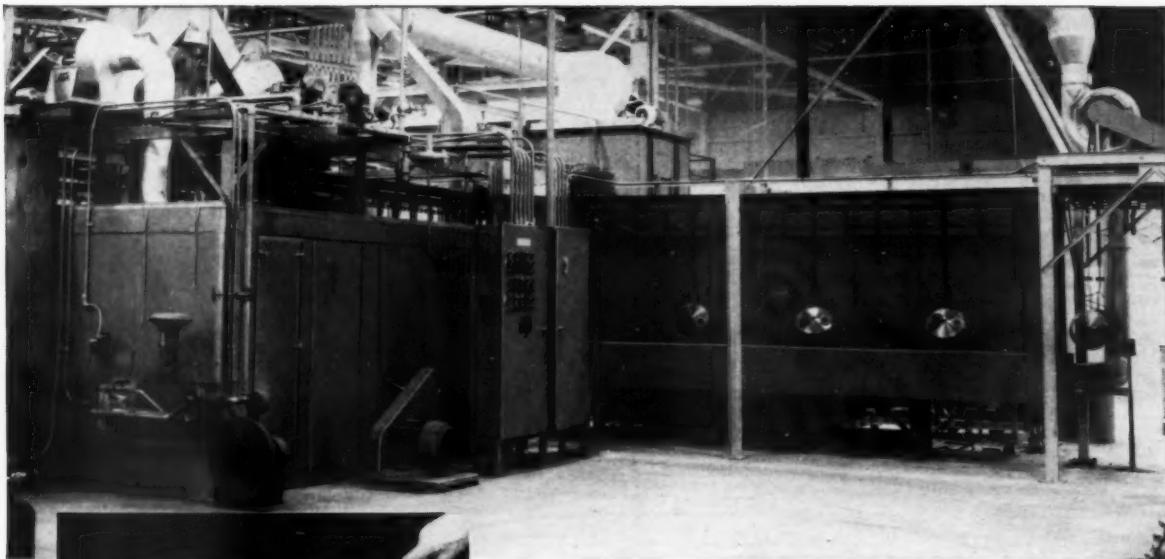


MILLS PRODUCTS
INCORPORATED

1015 WEST MAPLE ROAD

• WALLED LAKE, MICHIGAN





JOB REPORT

PRODUCT:

Stamped steel covers and structural components for high-voltage Westinghouse transformers. Coated with CORVEL^{*} cellulose to provide 12000 volts insulation, a gasketless seal, and a durable, decorative weather proof surface.

PROCESS:

Preheat parts, dip in "fluidized" bed of fine, dry plastic powder, and postheat. Oven temperatures held to plus or minus 5°F. Licensed fluidized bed process deposits tough, corrosion-resistant coating of uniform thickness on all surfaces, regardless of part configuration.

PRODUCTION:

Uninterrupted production of finish-coated parts from conveyorized installation of preheating ovens, dipping tanks, excess powder blow-off and collection units, and postheating ovens—custom engineered, fabricated and erected by MOCO for economical operation by Westinghouse Electric Corporation.

*Trademark of The Polymer Corporation for finishing materials.

MOCO, the Polymer Corporation and Westinghouse Team-up to Beat the Elements!

Teaming up to take advantage of the unique new fluidized bed coating process, Michigan Oven Company, The Polymer Corporation and Westinghouse Electric Corporation engineers recently completed target-date installation of a system for applying CORVEL^{*} fusion bond coatings at a modern new Westinghouse manufacturing center.

Designed to apply a protective coating on transformer covers, the new system demanded accurate timing and temperature control of parts during pre-heating and post-heating, complete scavenging of excess powder (for general safety reasons as well as economic ones), and continuous movement of parts in a specified path for uniform dip-coating.

Experienced MOCO design and process engineers provided an integrated system of ducts, blowers, conveyors, and heating and control equipment completely meeting Westinghouse specifications for quantity, quality and cost.

MOCO problem-solvers will welcome the opportunity to team their talents with yours. Write for the name of our representative nearest you.

FREE—Send for your MOCO bulletin showing typical finishing system applications and specifications; no cost or obligation, of course.



MICHIGAN OVEN COMPANY



FINISHING EQUIPMENT DEPT.
423 BRAINARD
DETROIT 1, MICHIGAN

Washing Machines • Bonderizing Units • Dry-off Ovens
Dip Tanks • Spray Booths • Flo-coaters • Finishing Ovens • Conveyors

Textured metals

→ from Page 75

vantage, and the metal has been used as trim on automobiles and as a flooring for helicopters.

Applications for the perforated textured metals include grille material on speakers for radios and phonographs, conveyor troughs, filters, lighting fixtures, air and heat grilles, screening, and partitions.

Three new applications of their textured metals have been announced by Ardmore. Textured metal has been specified as a grille over the fuel compartment vents on the rear deck of a pleasure boat, as a face plate on a tape recorder, and as a grille on the side of an automatic typing unit.

In addition to all standard mill finishes, these metals can be furnished plated, painted, polished, pre-clad, porcelain enameled, vinyl-laminated, or anodized. All metals, including aluminum, carbon steel, stainless steel, and aluminum and steel alloys are available in textured form.

A recent development in the application of textured metals is pre-applied solvent-activated adhesive, which Ardmore says has already proved itself in the appliance industry by reducing assembly costs and maintenance. The bonding procedure, which is said to permanently bond all textured metals to any surface, including chrome plated, painted or plastic, involves activating an adhesive-backed sheet with solvent and placing it in position, where it is held for a few seconds. Realigning is possible during this setting period, and processed pieces may be handled and packed immediately. The bonded surface is moisture-proof and has temperature resistance up to the 450° F. to 500° F. range.

Some large original equipment manufacturers have installed facilities for doing their own embossing or "texturizing." (See description of "rigidizing" exterior cabinets of heating and air conditioning units at Rheem Mfg. Co. in special *Rheem* section of this publication's January, 1956 issue.) Rheem's embossed steel is used to increase structural strength, dampen vibration, and enhance appearance.

The great majority of users, however, purchase the embossed metal from outside sources. Other companies producing "textured," "rigidized," and "embossed" metals include: American Steel & Wire Div. U.S. Steel Corp.; Pittsburgh Steel Co.; Sharon Steel Corp.; Acme Steel Co., and Rigidized Metals Corp.

GENERAL INDUSTRIES

Smooth Power

AC MOTORS
1/1600 H.P. TO 1/36 H.P.

For Extra Quiet Operation . . .



motors
with gear
reductions
for low-speed
high-torque
applications

Designed for low-speed, high-torque applications, GI Gear Motors are widely used in TV Remote Control Units, Vending Machines, Timing Devices, etc. Molded nylon gears in a dirt-sealed housing insure extremely quiet running plus rugged dependability. Rotor disengages, if required, when gear train is de-energized. For reliability, plus extra silent service, specify GI Gear Motors. Precision-made, with mass-production economy.

GENERAL SPECIFICATIONS

	MODEL 205		MODEL 308	
	Intermittent	Continuous	Intermittent	Continuous
SPEED	13 RPM	13 RPM	13 RPM	13 RPM
TORQUE	150 in./oz.	100 in./oz.	150 in./oz.	90 in./oz.
AMPS, No Load	2.5	1.25	1.2	0.6
WATTS, No Load	26	13	24	12
REVERSIBLE	No	No	Yes	Yes
CONDENSER	None	None	60 MFD	60 MFD

Above data based on 24 volts — Intermittent Duty 3 minutes on and 5 off.
Both models can also be supplied for 115 volts — 60 cycles.

MOTORS TO MEET EVERY REQUIREMENT



Write For Catalog and Quantity Price Quotations



THE GENERAL INDUSTRIES CO.

DEPT. GF • ELYRIA, OHIO

LIFE-RITE BY ALLIANCE WARE, INC.

NEW "BLACKBOARD" . . .
MADE OF LIFETIME
LEAD-BEARING
PORCELAIN ENAMEL
ON STEEL

GUARANTEED
TO LAST
20 YEARS

Easy to chalk . . . easy to erase . . . and available in a range of lifetime colors . . . that's the story behind this new, no-glare, metallic chalkboard currently brightening classrooms and conference rooms all over the country. Made of a 28 gage steel sheet coated with conventional porcelain enamel on both sides . . . and with a lead-bearing low-temperature cover coat (firing under 1200° F.) on the blackboard side . . . it forecasts a host of durable porcelain enameled products formerly impossible because of the warping and distortion inherent in the high temperature process.

With beautiful matte finishes in an endless spectrum of color, low-firing, leaded porcelain enamel opens a vast potential to the designer of products in and around the home. It may well be that leaded porcelain enamel can be profitably put to work for you. For information, write to: Lead Industries Association, 292 Madison Avenue, New York 17, New York.

2549

LOOK AHEAD WITH LEAD



TINT-TANIUMS

An exclusive product of Chicago Vit Development

GIVE YOUR RCA WHIRLPOOL REFRIGERATORS

manufactured by Whirlpool Corporation

MORE SALES APPEAL



To capture its share of today's style-conscious, consumer market, Whirlpool Corporation has incorporated fresh sales appeal in its refrigerators in a number of ways. One of them is through the use of Tint-Tanums on vegetable crispers. These colored frits, made exclusively by Chicago Vit, provide a number of distinct production advantages foremost among them being unequalled color stability. They are handled as easily as white titanium frits, and completely eliminate the chance for human error that exists in systems where colors are added at the mill. Tint-Tanums also bring you a number of distinct economic advantages. So, if you plan to use colors in your new models, you'll find it profitable to choose Tint-Tanums. There's nothing else like them!

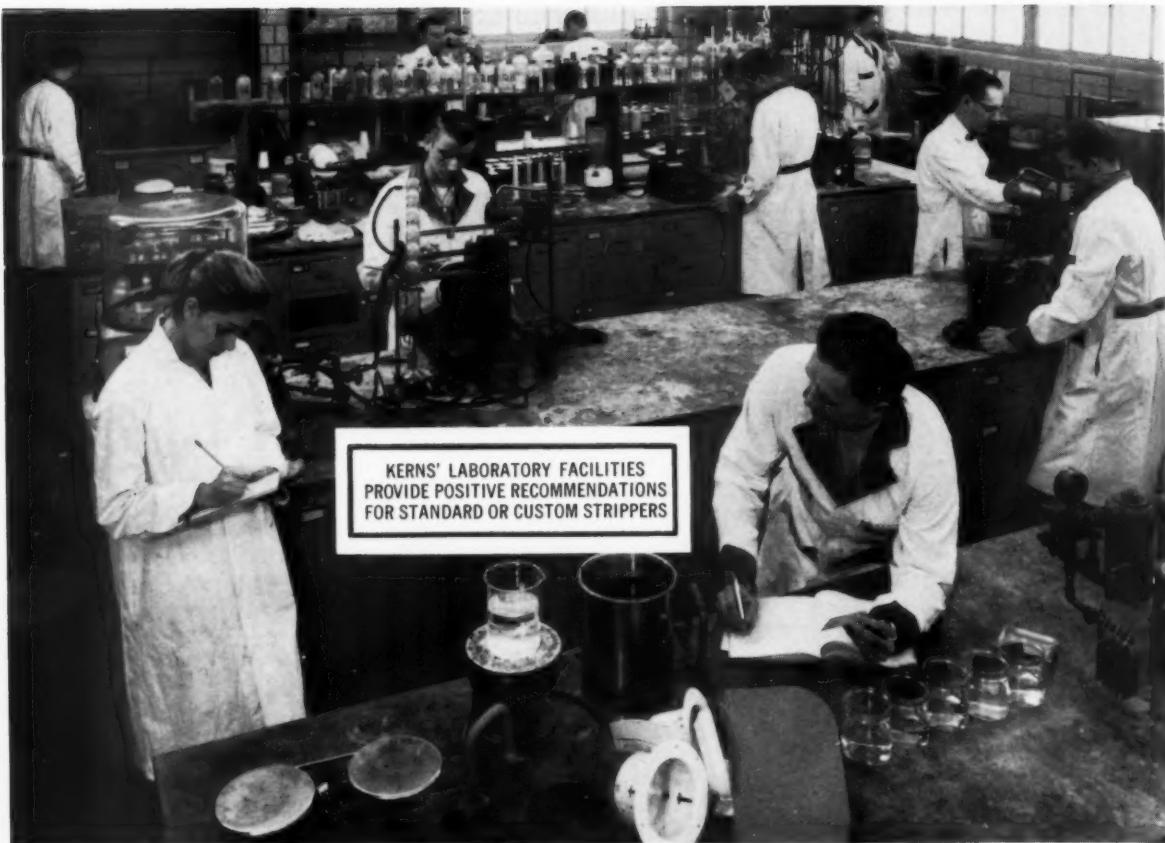
TINT-TANIUMS ARE EASILY APPLIED BY EITHER SPRAYING OR DIPPING (without streaking and without oxide separation) DEPENDING UPON THE REQUIREMENTS OF INDIVIDUAL PARTS INVOLVED.

The meat storage compartment (left center) is a light blue Tint-Tanium, and the twin vegetable crispers at the bottom are a dark blue Tint-Tanium. Model shown is the GA-1400, top-of-the-line gas refrigerator-freezer.

Chicago Vitreous
CORPORATION
A Division of The Eagle-Picher Company
1425 S. 55th Court, Cicero 50, Illinois

1918-1958 • 40 YEARS OF SERVICE TO THE PORCELAIN ENAMEL INDUSTRY

Tint-Tanium is a copyrighted name



KERN'S PAINT STRIPPER RECOMMENDATIONS CAN SAVE YOU PRODUCTION TIME AND MONEY

Kerns offers a complete line of low cost strippers, including hot alkaline, cold solvent and flush-off types. However, the type of paint alone does not always determine the most economical yet efficient stripper to be used...thickness of paint, base metal, cycling time, safety rules, method of handling, etc., are variables which should be considered.

Kerns maintains one of the finest and most modern stripper testing and research laboratories that is fully staffed with trained technicians of long experience in the industrial chemical field.

This facility is at your disposal free of charge and

*for general stripper recommendations request
Kerns' Stripper Selection Chart*

without obligation. For fast action, send a finished sample or panel to Kerns Technical Service Department with details of your operation. We can save you time and money by making the proper stripper recommendations.

Memo Billing Trial Basis

If you would like to test a Kerns' stripper on your own production line, we will supply material . . . no formal invoice rendered unless completely approved in production!



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Subsidiary Plant KERN'S PACIFIC CORPORATION 630 N. Batavia Street • Orange, California
Offices in Principal Cities throughout the U.S.A.

New Literature

→ from Page 70

cooled sealed condensing units 20-hp and under. Standard 515-60 is available at 25¢ per copy. Write Dept. MPM Air-Conditioning and Refrigeration Institute, 1346 Connecticut Ave., N. W., Washington 6, D. C.

Coil Cradle Catalog

Catalog B describes a line of standard motor driven cradles which feed 600 inches of stock per minute. The cradles are also built with variable speed drives for infinite feed ranges of 100 to 600 inches per minute. Write Dept. MPM, F. J. Littell Machine Co., 4143 Ravenswood Ave., Chicago 13, Ill.

Vacuum Metallizing Coatings

A comprehensive booklet, "Coatings for Vacuum Metallizing," describes in detail the application and use of vacuum metallizing coatings which may be applied by spraying, dipping, and flow coating to thermoplastics, thermosetting plastics, metals and glass. Base coats for use before metallizing as well as top coats and back up coats for use after metallizing are discussed along with other information on the metallizing operation. Write Dept. MPM, Bee Chemical Co., Logo Div., 12933 S. Stony Island Ave., Chicago 33, Ill.

Powdered Plastic Resins

The availability of a six-page brochure describing Micron resins has recently been announced. The powdered plastic resins for fusion coating are said to offer new design opportunities, sales appeal, industrial corrosion and/or insulation protection, and sharp edge coverage. Write on company letterhead to Dept. MPM, Michigan Chrome and Chemical Co., 8615 Grinnell Ave., Detroit 13, Mich.

Electric Motor Catalog

A new catalog lists hundreds of geared and non/geared electric motors from 1/2000 to 25-hp. Complete prices and electrical information is provided. Write Dept. MPM, B & B Electric Motor Co., 206 Lafayette St., New York 12, N. Y.

Drill Press Feeds

A new catalog, No. F-60, illustrates, describes, and gives detailed specification on a line of drill press feeds and tapping and drilling machines. The line of drill press feeds consists of standard-duty, heavy-duty and gear-head air powered feeds, either mechanically or

electrically controlled, and a hydraulic powered drill press feed for automating larger and heavier types of drilling machines. Write Dept. MPM, Beckett-Harcum Co., Inc., 985 W. Locust St., Wilmington, Ohio.

Protective Coating Systems

A new brochure describes a number of protective coating systems and matches them with specific application problems. Each page carries an index tab which indicates where a particular system should be applied. The copy backs up these tabs and explains the outstanding features of each system, suggests end uses and gives a brief mention of the colors available. Write Dept. MPM, The Glidden Co., 900 Union Commerce Building, Cleveland 14, Ohio.

Thermostat Metal Bulletin

How thermostat metal elements can be stacked to satisfy performance specifications in space that prohibits the use of a single element with sufficient material volume is the subject of a new two-page data bulletin, TRU-11. Multiple element assemblies in series, in parallel, and in parallel-series are discussed. Write Dept. MPM, General Plate Products Group, Metals & Controls Div., Texas Instruments, Inc., 34 Forest St., Attleboro, Mass.

"Tri-Finish" Process

Integrated, trichlorethylene-based degreasing, phosphatizing, and painting systems are introduced in a six-page illustrated catalog. The "Tri-Finish" Process is available in three basic systems: 1) Vapor degreasing and non-flammable tri-thinned painting in a single, compact unit; 2) Vapor degreasing and tri-phosphatizing combined in two units; and 3) Vapor degreasing, tri-phosphatizing and painting in a continuous compact system. For a copy of the catalog, write Dept. MPM, Industrial Dept. 000, G. S. Blakeslee & Co., 1844 S. Laramie Ave., Chicago 50, Ill.

Welding Symbol Standards

The latest revision of the American Standard Graphical Symbols for Welding has been approved by the American Standards Association and published by The American Society of Mechanical Engineers. Designated Y32.2-1959, the new American Standard provides the means of placing complete welding information on drawings. The 100-page booklet is available at \$3.00 a copy from the American Standards Association, 70 E. 45th St., New York 17, N. Y.

Announcing ...the latest addition to our family of quality products-

MEYERCORD DRI-MARK FILMS

DRI-MARK . . . is Meyercord's newly perfected line of PRESSURE SENSITIVE signs and trade marks produced as durable Truck Signs, Window Signs, Nameplates and Product Markings. These startling new films include:

DRI-MARK DECAL ★ **DRI-MARK VINYL** ★

DRI-MARK MIRRO-CAL ★
A mirrorized Mylar* vinyl laminate

DRI-MARK CLEAR MYLAR ★
A DuPont polyester film (1 mil and 3 mil)

DRI-MARK OUTDOOR PAPER ★
Chrome-bright mirrored film (1 mil and 3 mil)



These high tensile strength PRESSURE SENSITIVE films and laminates give the greatest possible latitude and flexibility to the Meyercord line of products, adaptable to all of your sign needs.

DRI-MARK Decals are processed with Meyercord's own exclusive PRESSURE SENSITIVE adhesive—another development of the firm that for 64 years has maintained the world's undisputed leadership in development and production of Decal products.

Meyercord's in-plant Research, Art, Production and Service facilities assure the most careful processing and quality control.

Remember, when it's DRI-MARK it's MEYERCORD!

with MEYERCORD COLORGARD 70

Now . . . all Meyercord DRI-MARK films are protected by COLORGARD 70 . . . Meyercord's exclusive laboratory-developed and perfected clear top coat—the toughest, most durable coat yet produced for the Decal and transferable film industry. Thoroughly tested! Two years in actual use!

Whatever your sign needs, you owe it to yourself to investigate Meyercord's complete line of products. Our factory trained representatives will be glad to assist you in the proper selection of markings for any particular requirement. Write today.

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Our laboratory magic
brings you

MICCRON

**POWDERED
PLASTIC RESINS**
*for Fusion Coating . . .
giving you*

- New design opportunities
- Sales appeal; with exciting, colorful new finishes
- Industrial corrosion and/or insulation protection
- Drip- and sag-free films
- Sharp edge coverage
- Wide ranges of materials in:
 *Vinyls, Cellulosics, Epoxies, and
 Nylons*

Micron Resins give you the physical and chemical advantages of these plastics in colorful, attractive coatings; applied by flocking, spraying, or the fluidized-bed process.

A six-page brochure, describing Micron Resins and their application, is yours for the asking. Write us on your company letterhead for the good news on these new, revolutionary coatings.

We'll look forward to hearing from you.

MICHIGAN CHROME and Chemical Company

8615 Grinnell Avenue, Detroit 13, Michigan





COMING FEATURES

DESIGN

FOOD WASTE DISPOSER WITH SHOCK ABSORBER MOUNTING
WHAT TO LOOK FOR IN FUTURE APPLIANCE DESIGN

FABRICATION

NEW DIE FORMS ANY ANGLE TO SIXTY DEGREES
NAMEPLATES WITH FLAME-CUT LETTERING
LATEST AUTOMATED LINE FOR STEEL CONTAINERS
SLITTING AND SHEARING AT UTILITY APPLIANCE CORP.

FINISHING

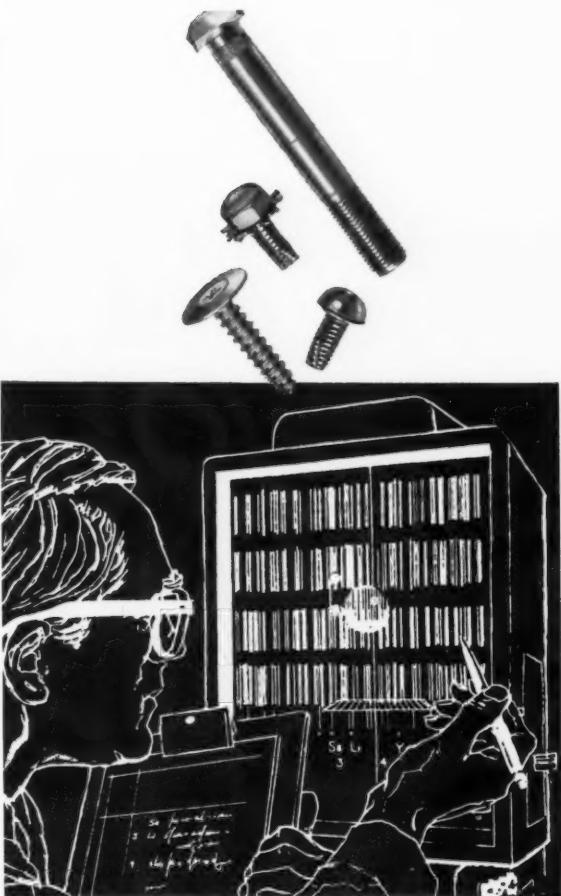
ENAMELING FURNACE HAS WIRE MESH BELT
PRODUCTION FINISHING ALUMINUM SIDING
CONVEYORIZED PAINT BAKING OVEN

GENERAL

SPECIAL SECTION — MAY — THE COMPLETE BUSINESS, ENGINEERING AND PRODUCTION STORY OF KELVINATOR
VOLUME PRODUCTION OF PORTABLE ROOM HEATERS
EXCLUSIVE FEATURE ON CURTAIN WALL CONSTRUCTION
SPECIAL SECTION — JULY — THIRD ANNUAL SECTION DEVOTED TO AUTOMATIC MERCHANDISING INDUSTRY (COIN-OPERATED MACHINES)

NEWS

MONTHLY STATISTICAL REVIEW
STAFF EDITORIAL AND PHOTO COVERAGE OF
ALL IMPORTANT INDUSTRY MEETINGS



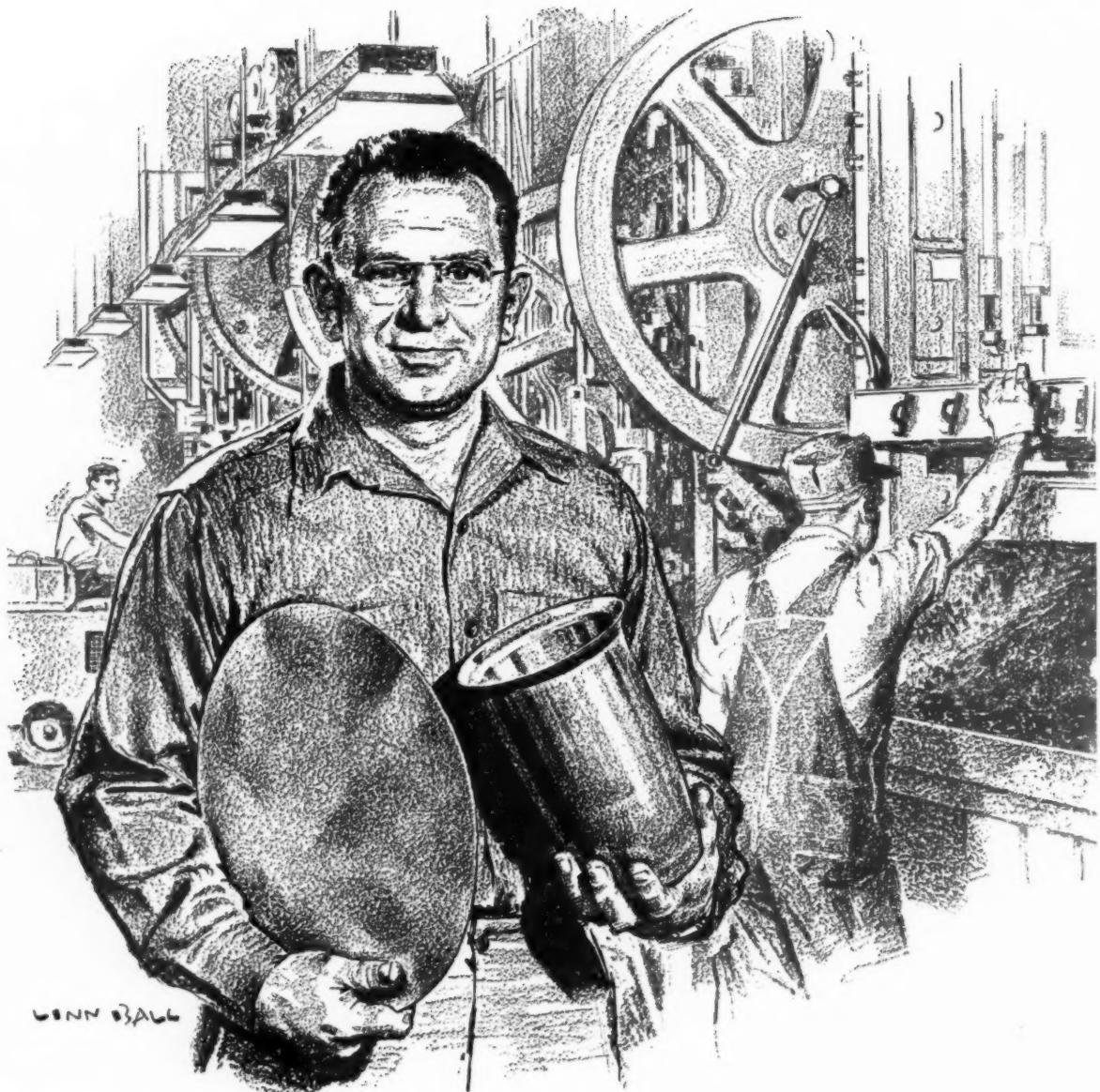
The high quality of
NATIONAL LOCK
FASTENERS
is more than skin deep

Quality wire is the basic ingredient for quality fasteners. That's why, at National Lock, quality control starts with elements of the raw wire. Here, a unique spectograph is used to make a complete qualitative analysis of the metal that goes into National Lock fasteners and cold-headed products. And, too, size, thread dimension, finish and other exacting customer specifications are checked with equal vigilance and thoroughness. National Lock fasteners are quality made inside and out to assure long-term, dependable performance.

STANDARD AND SPECIAL-PURPOSE FASTENERS
FOR AMERICAN INDUSTRY SINCE 1909



NATIONAL LOCK COMPANY
FASTENER DIVISION, ROCKFORD, ILLINOIS



**"For extra deep drawing we like Sharon
Quality Stainless Steels"**

— WALTER MARKOWSKI, Pressroom Foreman
S. W. FARBER, Inc.

"Here at Farber we really put stainless steel through severe tests," says Walter Markowski, pressroom foreman. Our product design calls for extra deep draws, delicate rolled edging and bright flawless finishes. Over the years we have found a most dependable source of prime stainless steels in the *Sharon Steel Corporation, Sharon, Pa.*"



SHARON *Quality* **STEEL**

Electric heating

→ from Page 27

an all-out effort to encourage commercial establishments to "go heat pump." One utility goes so far as to offer the following service to prospective heat pump customers: determining the heating and cooling load; selecting the equipment; preparing drawings and specifications; obtaining bids; and furnishing a supervising engineer to make certain the system is properly installed. The service is supplied at no cost.

The northern market

The trend to heat pumps in the warmer climates of the country is obvious. The big job manufacturers face is to penetrate the vast residential market in the Midwest and other areas that are not blessed with mild climates. Some observers feel that the present equipment is not built for satisfactory service in these areas. Others feel that improvements in heat pump design engineering will soon meet the requirements of the colder climates. Some manufacturers believe their equipment is already suited for such applications — a few are contemplating the production of units specifically designed for the north.

One thing is certain: the potential market for heat pumps has only been touched. With continued refinement and improvement of heat pump design, and cooperation from the utility companies in the form of favorable power rates, the future of the heat pump industry could be rosy, to say the least.

Thermoelectricity

The heating source of the future may be thermoelectricity. Who says so? More than 100 companies who are spending great sums of money on research and development in this field.

What is thermoelectricity? It makes possible the direct conversion of heat into electricity or electricity into heat with no intermediate moving parts. It is based on the operation of the solar generator, which concentrates the sun's rays on a particular area to create temperatures of thousands of degrees Fahrenheit. Such heat concentrations can be focused on one end of a metal bar, the other end being refrigerated. The tremendous difference in temperature sets up a flow of electrons comparable to that created by an electrical generator.

A variation of the same principle has resulted in the development of a small refrigerator which has no moving parts. The cooling effect is obtained by applying electrical power to two bars of dis-

similar material which are coupled at both ends. One end of the combination becomes warm while the other becomes cool. The same principle is applied for heating.

One manufacturer is already making a ceiling bathroom heater based on the thermoelectric principle. Another company believes a forced air furnace independent of any outside power source is a future application. Heat from the furnace would provide the power for the forced air system. There would be no heat loss.

Don't look for an overnight boom in the use of thermoelectricity. It may take a decade or more to get the principle into widespread application. But it is something that could very well influence the electric heat industry, and therefore should not be ignored.

Avoncraft

→ from Page 47

tion. This type of work is run through the spray booth in quantity with the top part being sprayed and fired prior to the application of the color to the lower section. A strip of pressure-sensitive tape is then applied to form a line of demarcation, and the bottom, or wainscote, section of the panel is sprayed in the second color and then fired.

Sixty and 30-gallon pressure tanks are loaded by gravity from the overhead storage area and trucked a short distance to the spray booths. Sprayers are trained to apply 2.5 to 3 mils thickness of ground coat, and a total of 6 to 7 for ground and cover.

Both ground coat and cover coat are fired at approximately 1475° F. in a gas-fired, muffle-type, straight-through, continuous furnace. The furnace is 110 feet long and has a pre-heat zone of 35 feet. The firing time is 3½ minutes. The ware is only up to 1475° F. for approximately 45 seconds. The maximum size of panels run through the furnace is 15 to 16 feet in length by five feet in depth.

At the exit end of the furnace, a service conveyor, running parallel to the furnace chain, picks up the finished enamel ware and transfers it to a section of the plant termed the "construction department."

Assembly and marketing

Pre-assembly is effected to the utmost in connection with the packaged buildings, to minimize field assembly problems. Every section that can be put together in pre-assembled form in the factory is designed for this purpose.

Avoncraft maintains an aggressive en-

gineering sales division with representatives throughout the United States and in Puerto Rico. Inquiries regarding either standard products or specialized applications are forwarded to the main sales and engineering department at Avondale for handling.

A separate organization, Avoncraft Construction Company, handles the transportation and erection of the packaged buildings. In a storage section at Avoncraft, it is possible to see as many as 50 to 60 completed buildings, stored as units and separated only by the necessary packaging and dunnage required for shipment by truck.

The construction company operates with thirty installation crews. While these crews work out of New Orleans for the most part, they may be scheduled to stay as long as six months when in distant territory.

The editors of MPM wish to credit A. J. Leggett, Jr., Manager, Avoncraft Div., and Hugh Atkinson, Chemist, for technical assistance in connection with our staff coverage of the Avoncraft Division plant.

Urethane foam

→ from Page 40

ging from the curing oven. The unit is now ready for transfer to the assembly line conveyor.

Through the use of the urethane foam insulation, the wall thickness has been reduced from four and four and one-half inches in varied areas to two and three-fourths inches throughout the cabinet. Even with the urethane foam type of insulation, it is pointed out that the practice of vapor sealing the cabinet is continued.

Whirlpool engineers point to greater structural strength of the cabinet through the use of the foamed-in-place liner. It is also expected that liner damage will be minimized, through the elimination of liner supports at the front edge of the cabinet.

Automatic door line

Both of the doors (freezer and food compartment) are insulated with the same urethane foam material. On this line, however, the foam is poured into part of door as it passes an automatic metering machine. The jigs that clamp the door are automatically lowered and, after passing through the curing oven, are automatically raised.

The unit line (the area behind the freezer section) which encloses the evaporator for both the freezer and the refrigerator is also foamed in a "block" on a setup similar to that described for the cabinet line.

Spray, dip, or flow coating . . .

DeVilbiss totals

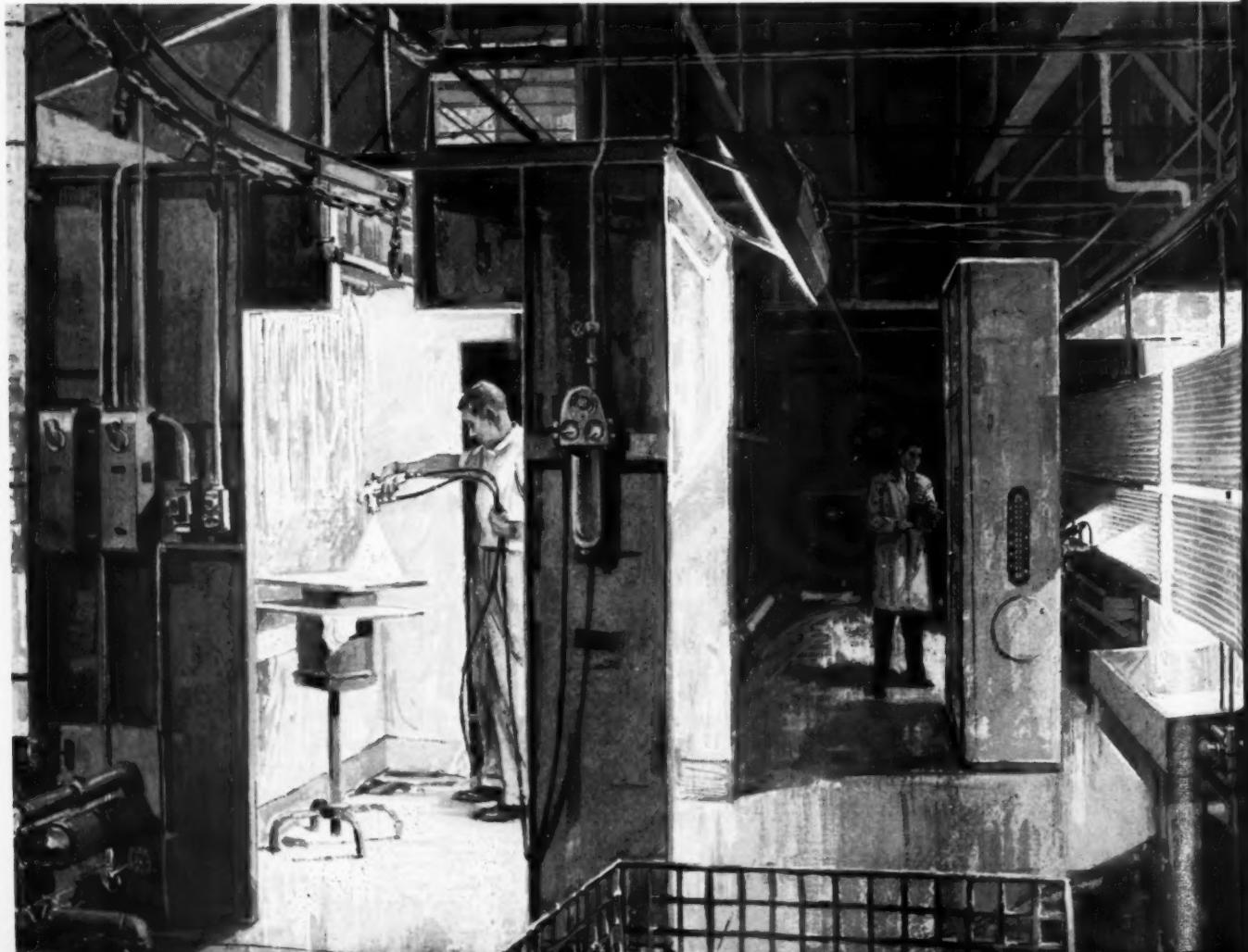
can help determine the best method for you

Large job or small, you get an unbiased recommendation from DeVilbiss for the coating method that will work best for you. For, DeVilbiss is the only company that manufactures a complete line of coating equipment—from individual spray guns to engineered finishing systems.

Trained engineers provide total service from initial planning to complete training of operational personnel. Furthermore, our customer research laboratory will run comparison tests of

your products for actual results that reveal what method is best for you. Or DeVilbiss engineers will suggest ways to make your present system more efficient with minimum changes, and on-the-job operator training.

See how DeVilbiss total service can help you. Just contact our nearest representative or write: The DeVilbiss Company, Toledo 1, Ohio. Also Barrie, Ontario; São Paulo, Brazil; and London, England. Branch offices in principal cities.

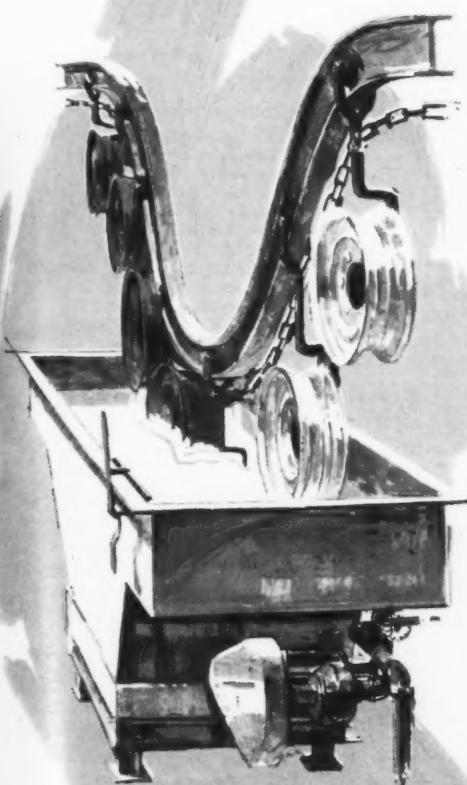


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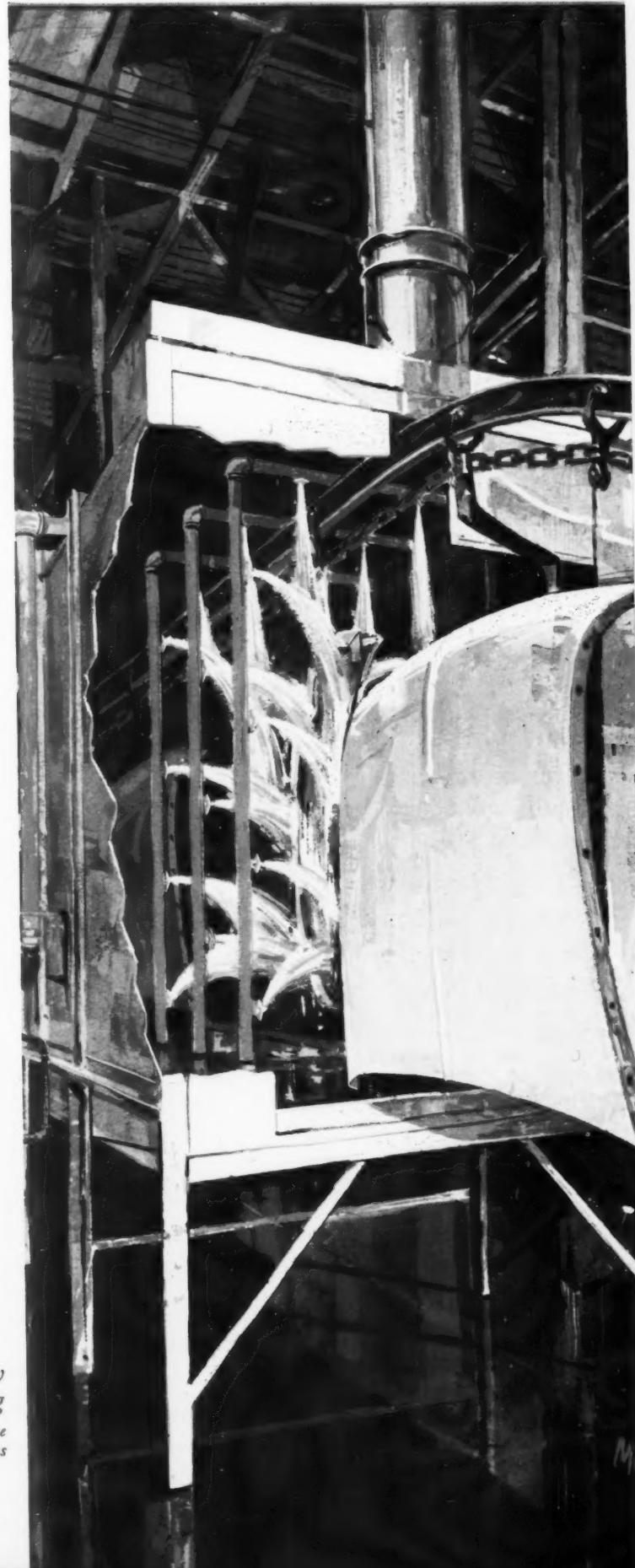
Dip coating Continuous process or batch type, with scientific vapor and viscosity controls to ensure uniform finishes

Flow coating

Saves man power, floor space in prime- or single-coat applications

Spray coating

DeVilbiss manual and automatic equipment coats products of any size or shape quickly, economically



CLASSIFIED

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PROJECT ENGINEER

A long-established Midwest manufac-
 turer of home appliances has need for a
 development engineer with several years
 experience in the design of home laun-
 dry appliances to assist in devising im-
 provements, cost reducing changes, and
 new features. Send résumé and salary
 requirements to Box 4A, Dana Chase
 Publications, Inc., York St. at Park Ave.,
 Elmhurst, Ill.

PRODUCTION ENGINEER

Wanted — Production engineer, pref-
 erably with experience in handling
 both personnel and production, as as-
 sistant to production manager. Man in
 thirties or early forties preferred.
 Salary commensurate with background.
 Good opportunity for advancement. All
 replies held in strict confidence. Send
 complete résumé of education and ex-
 perience to Hardwick Stove Co., P.O.
 Box 457, Cleveland, Tenn.

Spray-applied finishes

→ from Page 81

3. Rejects can be stripped of their vinyl finish chemically and re-sprayed.
4. Welding and forming operations are done prior to coating.
5. Finish can be sprayed on complex shapes and castings, as well as flat surfaces.
6. No raw or unfinished edges.
7. To change color, merely change the vinyl spray material. No unnecessary investment in inventory.
8. Scrap metal is uncoated, keeping up its value. Waste of vinyl is eliminated.

This material is currently being used by such companies as General Electric, Appliance Park; IBM; Remington Rand; and Whirlpool. For additional information, contact Donald W. Oakley, Metal & Thermit Corp., Dept. MPM, Woodbridge Road, Rahway, N. J.

you need a PROCTOR on your range

CHAMPIONSHIP CONTROL

PROCTOR "SELECTRONIC"
PAN CONTROL

scores strikingly in increased range sales. New cooking ease, because of accurate *at-the-pan* temperature control plus infinite selection of *any* temperature, has made "Selectronic" a real champion—and with room to spare.

PROCTOR "Selectronic" splits coats, too. It is simpler and easier to install; has but two components, and fewer connections. Check these "right-down-the-alley" features that make PROCTOR "Selectronic" the king-pin of every modern electric range:

- * Consists of but two components . . . there is no troublesome transformer or fragile hydraulic tube.
- * Easy to install . . . lowers your assembly cost.
- * Provides infinite, stepless selection of the exact heat you want . . . never too hot or too cold.
- * Responds instantly to temperature change . . . and to the rate of temperature change . . . a true proportioning control.
- * Both components compensate fully for ambient temperature variations.
- * Both components are smaller . . . the sensor is smooth stainless steel, free of crevices . . . stays clean.

Bowl over all competition with a PROCTOR Range Control



THE PROCTOR-SILEX CORPORATION, Controls Division, 700 West Tabor Rd., Philadelphia 20, Pa.

PROCTOR

YOU CAN HAVE THE FINEST...

Specify **TEP** Products

14-Point Assembly Line Inspection Pays Off In Every-Day Performance

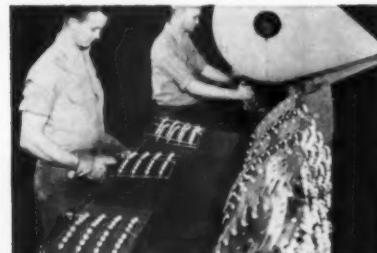
Fine quality and long service never just happen. They are the result of good materials, exceptional know-how and an exacting plan of quality control.

TEP Open-Coil Heating Elements get the benefit of 14 progressive inspection operations. Because of this careful quality control procedure, appliance manufacturers are always guaranteed dependable performance with "TEP-built" heating elements. 100% inspection of all units also saves time and trouble in assembly and testing.

Always specify quality and service . . . specify TEP.



Inspection of frame slotting operation assures depth control for crossbar "breathing space."

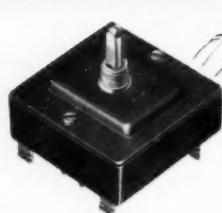


Outer frame gauging and visual cross-bar check insure squareness in accordance with specs.



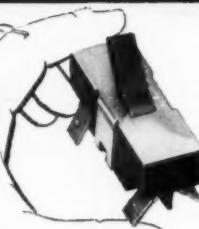
Shape gauging inspection is another control that saves installation time and trouble.

For Appliance and Related Applications



1 HEAT SELECTOR SWITCHES

Series 3000 rotary snap-type switches, also manufactured by TEP for electric ranges, air conditioners, space heaters and related applications, feature positive, trouble-free contact action and 7-heat selection. They are available either with or without pilot light and with different shafts and handles to suit your needs. Write today for sample and quotation.



2 TOGGLE SWITCHES

The unusual simplicity of the new TEP Toggle Switch design achieved by Tuttle Research Engineers, now provides a dependable, top-quality switch at lower cost. Considerably smaller than comparative switches offering the same variety of contacts, it includes provisions for four-way wiring connections. There are only 11 working parts, and the complete switch weighs less than one ounce.



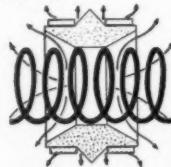
3 SINGLE POSITION INFINITE CONTROL

The N-14 Control enables a heating unit to deliver all or any portion of its heating capacity. Proportioning of heating capacity is accomplished by a pre-setting of the control knob, thereby controlling the time of contact dwell. Furnished in various time cycles depending upon your requirements, i.e., from 4 R.P.M. to $\frac{1}{2}$ R.P.M. cycle motors.



4 TUBULAR HEATING ELEMENT

This element is ideal for a wide range of applications. It's highly efficient in heat guns, hair dryers, space heaters, hot food vendors, photo print dryers, and other products where air is to be heated while flowing through a tube or nozzle. It can be controlled thermostatically and furnished in ratings from 500 to 2000 watts at 115 or 220 volts.



5 OPEN COIL HEATING ELEMENTS →

The design and manufacture of "open coil" heating elements has long been a major TEP service to the appliance industry. TEP has designed and developed many new and exclusive features, such as the one illustrated with diamond shaped insulators. Call or write today for TEP design and engineering assistance on any job. There is no obligation.

Cross-sectional view of new TEP insulator and cross-bar design. More space for air circulation assures better heat dissipation, longer wire life.
Patent No. 2921172



Wire-threading and inspection are combined in 14-point TEP assembly-line procedure.



Final hi-potential and ohm check before packaging insures correct wattage and wire size.

WRITE TODAY for complete data and quotations

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